Electrical Review

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How One Contractor-Dealer Built His Business

Laying the Foundation by Hard Work Which Netted Ambitious Man Experience and Knowledge—Starting Fixture and Appliance Store With $480—Success Through Square Dealings and Service

By WILLIAM B. EASTWOOD

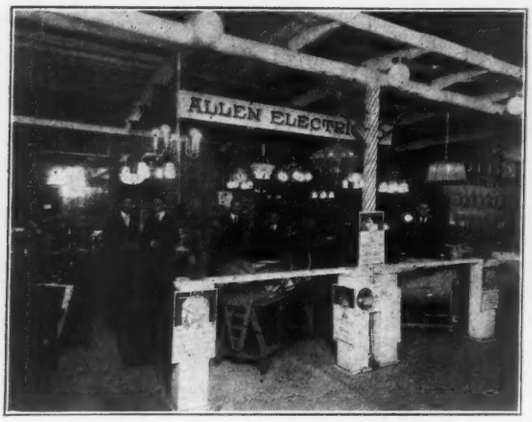
Work, honest dealing and the rendering of good service to customers will continue to rank first in the making of successful electrical contractor-dealers regardless of the amount of money employed in the initial investment.

This is the story of a young man who started with nothing but his health and a determination to win in his chosen profession. He worked by day and studied by night until he had accumulated a fund of practical experience, some theoretical knowledge and less than $500 in money. With his little capital he opened a modest appliance and fixture store, then set to work to apply his experience and knowledge toward the building up a successful business for himself. It took work, and plenty of it, day and night, as duty and the application of his code of business called to his desire to serve.

Today this man has attained an enviable goal—one that would satisfy the average man—but he continues to work, always alert to meet an emergency and to render the kind of service that has endeared him to his customers and established for him a trade that cannot be lured away by competition.

The story of "Ben" Allen, of Lexington, Ky., is an inspiration to any contractor-dealer who needs a bit of atmosphere from the outside, a hint of encouragement from one of his craft, to give him a fresh grasp on the immense possibilities

Present Salesroom of Lexington (Ky.) Store of the Allen Electric Co.



Booth of Allen Electric Co. at 1919 Style Show.

First Store of Allen Electric Co., Representing an Investment of $485.

ready and awaiting the man who will work in the retail electrical appliance business.

What this man from Kentucky has done and is doing, others can do. He is a modest man. He does not know how fully he is master of the safest and surest principles of business building. That is why he so cheerfully answered the questions put to him by ELECTRICAL REVIEW, modestly relating his story of achievement step by step as one would relate what he saw while passing through an art gallery or on a railroad trip.

To this man the trade of his community comes because he continually holds the interest of his people by working to give them the best and most satisfactory service possible. He sells them the fixtures and appliance in which he has confidence, he follows up his sales and keeps them in working order, and he is not afraid to answer an emergency call at night to set a motor in order or make other repairs that will help his customer to get going again. He may not be well versed in large spreads of advertising in the newspapers, but his every action, and all his work, continually advertises him as a man in whom to rely. That is what the people want—reliability in business dealings.

STORY OF THE MAN WHO LAID A GOOD FOUNDATION FOR THE FUTURE.

In 1894, "Ben" Allen ran away from his home in the foothills of Garrard county, Kentucky, and went to Lexington. Ben secured a position as helper with the old Central Electric Co. at the modest sum of $4 a week. He worked as helper-lineman, arc-lamp repair man, trouble man, meter repair man and assistant engineer at the power plant, going from one department to another for 4 yrs. He then became electrician for the West Baden hotel, West Baden, Ind. Leaving West Baden, "Ben" Allen became chief engineer for the Mitchell (Ind.) Power & Light Co. He then became inspector for the East Tennessee Telephone & Telegraph Co., and following that, was for 11 yrs. general utility man for the Georgetown Water, Gas, Electric & Power Co., Georgetown, Ky.

While employed with the Georgetown company Mr. Allen would, after working all day, sit up late at night to study a course of electrical engineering by mail from the Joseph G. Branck School of Engineering, Chicago, getting a di-

Show Windows in Front of Lexington (Ky.) Store of the Allen Electric Co.

ploma with an average of 95%. Equipped with this course and 26 yrs. of experience, Mr. Allen is thoroughly capable of attending to all matters connected with his present business.

In May, 1916, "Ben," by which name he is best known, became tired of working for the other fellow after 22 yrs. and moved to Lexington with his family, opening a little shop at 148 North Broadway. His wife kept the books and looked after the little office. Ben, with one man, R. E. Foreman, constituted the force. Ben and "Eb.," as Mr. Foreman was called, wired houses all day. Mrs. Allen received the first orders and took in the appliances that the public would leave for repairs. After supper Ben would do the repair work, staying sometimes in the shop as late as 1 a. m., and was always ready to go to work the next morning when Mr. Foreman arrived. Eb is still with Ben, and instead of doing little odd jobs, is always engaged on work that runs into the

B. F. D. Allen.

thousands. At this time he is installing the wiring and the 350-hp. power apparatus for the Kentucky Street Products Co.

J. C. Robinson, for many years with the Madison (Ind.) Light & Power Co., is now connected with the Allen Electric Co. He is a first-class electrical engineer and the Allen Electric Co. conducts business as consulting engineers and contractors, carrying a full line of electrical fixtures and appliances. Mr. Allen says he gives "Allen Service" on anything in the electric line, from door bell to power plant complete.

Business Founded on Work, Honesty and Good Service.

When the Allen Electric Co. opened its little shop back in 1916, Mr. Allen says his assets were actually but $485. Asked to what he attributed his success he says, to hard work, square dealing and giving service. Mr. Allen says he has installed emergency motors in the middle of the night, going himself when one of his men was not available.

The Allen Electric Co. has grown from the $485 stock of 1916 to one of the largest stores in the South. Today he has $25,000 in stock, and in 1919 did $100,000 of business. A few weeks ago he opened another fully equipped store in Paris, Ky. Mr. Allen is so interested in the business that he has little time for pleasure, and all the salesmen who call on him know that they have to take chances on catching him, as he is on the go all the time. The Allen store in Lexington is now located in the center of the business district and has a very fine display of fixtures and appliances. Besides the ownership of the Allen Electric Co., Mr. Allen owns 100 lots in the suburbs of the city and an elegant home on South Broadway, and he will answer an emergency call at any time.

Mr. Allen belongs to practically all of the clubs of the city. He is a member of the Board of Commerce and an enthusiastic member of Kiwanis Club, whose aim is to build homes within the house; to help build their city, their state and their nation. He is also a Past Grand of the Independent Order of Odd Fellows, a Maccabee, Mason, Knight Templar, and also a member of the Patrol of the Ancient Order of the Mystic Shrine.

OREGON DEALERS PROTEST ANNUAL DUES TO N. A. E. C. D.

Annual Convention at Eugene Develops Spirit of Sectional Co-operation Rather Than Large Tax to the National Association.

By W. A. Scott.

The 10th annual convention of the Oregon Association of Electrical Contractors and Dealers was held June 13-14 at Eugene. The occasion served as an outing for those of the members who enjoy fishing, and playing golf and base ball. However, the state Executive Committee, which guides the destiny of the organization, held two busy sessions on the first day. Its members comprise R. C. Kenney, chairman, Portland; F. C. Barton, Salem; L. B. Sigwart, Eugene; B. W. Paul, Medford; E. S. Colby, Hood River.

The chief work of the committee was to take up unfinished and new business and formulate recommendations and resolutions to be submitted to the convention at its business session later. The subjects taken up pertained to closer relations with the jobbers, supporting the work of the Northwest Electric Service League, and the issues between the State Association and the National Association.

The business meeting, presided over by R. C. Kenney, Portland, state chairman, was well attended. The reports of Frank R. Whittlesey, state secretary, and John R. Tomlinson, state treasurer, were read and approved. Those reports gave a good insight into the affairs of the Association, showing harmonious co-operation and stable conditions. These were followed by the verbal report of R. C. Kenney, retiring state chairman.

In reviewing the Association's work, Mr. Kenney said the dealers and contractors of the state were 90% organized. He advised co-operative work among members in the effort to create and maintain normal conditions. The Northwest

Electric Service League was commended for the good start it had made and an appeal was made for its support. J. R. Tomlinson gave a brief synopsis of the League's work and referred to the home-electric and commercial exhibits to be made.

The relations between the Oregon Association of Electrical Contractors and Dealers and the National Association of Electrical Contractors and Dealers came in for much discussion, which centered on a resolution submitted by the Executive Committee. The gist of the resolution and the drift of the discussion were in effect a protest against the amount of annual dues the State Association is required to pay into the treasury of the National Association. The resolution which was adopted, directs the State Association treasurer to withhold the payment of such dues until the differences are adjusted.

It is understood that the associations of Washington and California have assumed a similar attitude. The Oregon and Washington associations have joined with the electric power companies, electrical jobbers and manufacturers in sustaining financially the Northwest Electric Service League, and its work is deemed of prime importance. The question arose as to whether or not the Association's action would put in jeopardy its membership in the National body, but the resolution was adopted, nevertheless. It is not a question of paying membership dues to the National Association, but rather a protest against paying 50%.

The proposal to seek the co-operation of the Contractor-Dealer executive boards of Oregon, Washington, California, Idaho and Nevada, which was put in the form of a recommendation, was adopted. Matters pertaining to wiring regulations and the state license law came in for some discussion. There was voiced a demand for more thorough inspection of electrical wiring. L. W. Going, chief electrical inspector for the city of Portland, read a paper on municipal inspection. He said the Portland code was a step in advance of the National Code.

In the election that followed, J. H. Sroufe, of the Jagger-Sroufe Co., Portland, was chosen state chairman, to succeed R. C. Kenney, who resigned. J. R. Tomlinson and R. C. Kenney were named to represent this Association in the Northwest Electric Service League, and B. W. Paul, Medford, was delegated to represent the Association in the coast division of the National Association.

The principal session of the second day was held at University Hall. The three speakers were A. C. McMicken, Portland Railway, Light & Power Co.; M. H. Aylesworth, executive manager of the National Electric Light Association; and Robert Sibley, editor of *Journal of Electricity*. Mr. McMicken talked on "Association Spirit," and said it was this that holds together members of an industry, both for self interest and altruistic motives. He thought the Northwest Electric Service League was destined to develop the association spirit and help individual members to success.

The splendid address of Mr. Aylesworth was heard with the keenest attention. He advocated state control of utilities, as against local control, and said the N. E. L. A. stands for thorough co-operation among all the branches of the electrical industry, including power companies, manufacturers, jobbers, contractors and dealers. An essential thing is to tell the electrical story to the people, and tell it right, and to accomplish this he proposes a big publicity campaign. He criticized the power companies for keeping silent when false and misleading attacks were made. Mr. Sibley gave his illustrated address on the power development west of the Rocky mountains.

The closing session in the evening was given over chiefly to hearing an address by Dean Stephen I. Miller, secretary-manager of the Northwest Electric Service League.

"AJAX" CAPITALIZES WORLD'S BIG FISTIC BATTLE.

Grasping the opportunity to "cash in" on great events, or making capital of popular local incidents, is a form of advertising whose value cannot be overestimated. The fact that the great Dempsey-Carpentier fistic encounter is to take place in the same city, and within a short distance of its home office, has been taken advantage of by the Ajax Electric Co., of Jersey City, N. J., of which W. C. Banks is president.

This company has prepared a pocket folder which it is sending broadcast to the trade. The folder contains a map of the railroad terminals and connections of New York City, Jersey City and environs, showing transportation facilities to the Montgomery Park arena where the fight will take place. It also contains a seating chart of the great arena and much data of interest to those who follow the sport. Attention is called to the proximity of the Ajax plant to the arena and to the various hotels and rail terminals, and friends and customers are invited to call as well as telephone or write for any information they desire in connection with their proposed visit to the fight. The folder is interesting even to those who do not intend to go.

S. E. D. OFFERS TO HELP CANADIAN ELECTRICAL INTERESTS.

The 31st annual convention of the Canadian Electrical Association came to a close Thursday evening, June 17, with a banquet at the Kent House, Quebec, at which W. L. Goodwin expressed the wish that the Society for Electrical Development co-operate to a greater extent with the electrical interests of Canada. In one of his characteristic talks Mr. Goodwin pointed out how the S. E. D. could be helpful to the Canadian electrical people in developing Canadian industry for Canadians. Mr. Goodwin said in part: "My work in Canada has always been to the end of building the Canadian electrical industry in the interests of the Canadian public and Canadian concerns, and it will be my policy and the policy of the Society for Electrical Development to continue along the same lines."

After enumerating some of the general activities of the Society, such as the broad work of educating the public through the medium of articles in the daily newspapers, popular magazines and the trade press, Mr. Goodwin went on to point out that the Society was ready to render a more specific help to the Canadian electrical interests in assisting them in advancing their own industry.

Stimulation of Dealer Salesmanship by the Jobber

Wholesale House Welcomes Retailer of Electrical Appliances to Valuable Discourses on Best Methods of Promoting Trade and Building Successful Establishment — Future Possibilities

By J. A. DUNCAN and T. A. BROOKE
Sales Managers, Illinois Electric Co., Chicago.

Labor-saving electrical appliances now on the market offer the best business in the electrical field today. The training of the jobber and dealer toward full recognition of their responsibility for the securing of unprecedented results in merchandising sales has been undertaken by the Illinois Electric Co. It is the desire of this concern to place before them some facts regarding the present situation, to remind them that the period of reconstruction is over and that no longer can shortage of material hamper their efforts nor the condition of the market limit their sales. There is now plenty of material and a very fair market in which to operate; all that is now required being to lift ourselves out of the customary manner of awaiting the arrival of better times and to bring about the best trade conditions ever known by the application of original, consistent and energetic salesmanship.

One room in the headquarters of the Illinois Electric Co., in Chicago, is devoted to "Talks to Salesmen." The company invites dealers there and endeavors to bring them in for a helpful discussion. It is contended by the energetic members of this company that the field for the merchandising of electrical appliances is unlimited and that the surface has as yet been scarcely scratched.

Too much emphasis cannot be placed upon the fact that the electrical merchant has it within his power to be successful if he desires to work. Just as much business as he is willing to seek exists all about him. Manufacturers have provided him with many excellent electrical labor-saving machines which, if brought to the attention of the public through proper advertising and with energetic, personal demonstrative activities, will form an irresistible combination that will spell no other word than "Success."

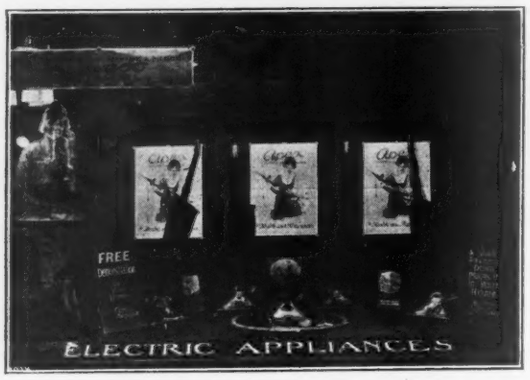
Modest Homes and Time-Payment Plan Prove Most Successful.

One of the recommendations of this company is that an electrical dealer, when taking on a line of appliances, should advertise sales and service. A certain guarantee should be attached to each sale to keep the article in repair for a stated length of time, and at the expiration of that period serv-

Model Display of Vacuum Cleaners in Windows of Illinois Electric Co., Chicago.

ice should be rendered the customer at a moderate cost. This should not be made into an essentially productive department, but one merely for service.

The time-payment plan, according to this company, brings larger results than any other method in disposing of electrical goods and is easily adopted by the dealer who has been long established in his location. Bankers are usually less willing to assist the new merchant starting on a small scale. It has been determined through experience that labor-saving machines are not so readily placed in the wealthier homes as in those of the middle or even poorer classes where housewives must re-



Window Display of Ideal Electric Co., Ft. Dodge, Ia., Distributors for Illinois Electric Co.

duce their individual labor and time to the minimum required. It has been found that there is scarcely a housewife who cannot pay $5 or $10 a month for a device which will save her a great deal of work, and in such instances the installment sale becomes a blessing to dealer and customer alike. If most housewives of this type waited until a spot cash order could be given there would seldom if ever develop a time when a sale could be made.

There is another hint that should be brought to the attention of the dealer. This applies to his tendency to become dissatisfied with a line he is carrying if a competitor chances to sell two or three of some other make. Upon hearing of this he is likely to place his original stock upon the shelf and obtain the other kind without making any further effort to dispose of the first. This dealer should remember that customers seldom make their own selection, the disposition of electrical wares depending wholly upon the character of the selling effort involved.

Because of their experience, members of this company feel that they have a great deal of valuable information for dealers, and that it is their duty to impart this information where and when it will be welcomed. They would like to explain to dealers just wherein "discount" does not necessarily mean anything to them. The main issue lies in quickly turning over their stock. Dealers are advised to buy in small quantities in preference to submitting to an over-zealous salesman whose argument, that an order for 100 articles brings a larger discount than one for 20, sometimes involves the dealer in financial perplexities. Many dealers do not understand the relationship of "discount" to the "turning over" of stock, and if progressive dealers wish to learn, this company will be glad to have them correspond regarding the subject. There are some interesting facts to be had which may alter their entire viewpoint concerning manufacturers' and jobbers' discounts as pertaining to themselves.

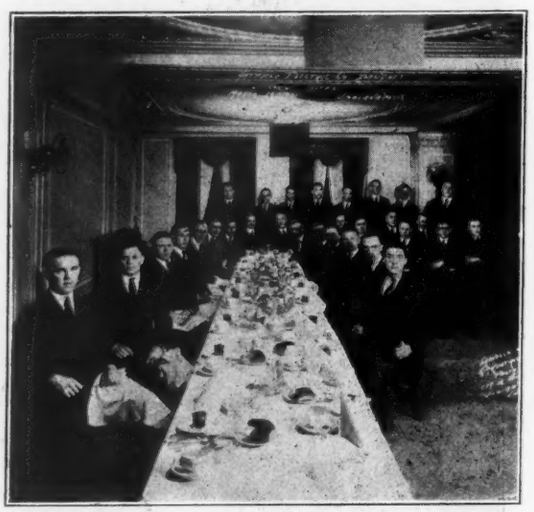
Greater Sales Success Lies in Making Demonstrations in the Home.

One great message this company has to give the dealer is, that he will have to revise his selling methods if he is not already going out after his customers. No longer can he place his goods upon his counters and shelves and await a demand. Advertising alone will not attract the large class of customers who await the personal sales effort of a home demonstration. Wherever it seems advisable, leave the appliance for the housewife's trial. This method will absolutely bring excellent results.

Some dealers report that they are enlisting every one employed in their organizations in a selling campaign, offering inducements to bookkeepers or clerks, working in whatever capacity, to extend his or her capabilities toward the selling of electrical appliances among acquaintances, several of whom may be called by telephone every day, a method which often doubles business.

The electrical appliance business is essentially one of co-operation. When, for instance, the Illinois Electric Co. takes on a new appliance, the management is not satisfied to pass judgment upon it with the aid of their own experience, but call in electrical or mechanical engineers and obtain their advice or approval. After passing it through a series of tests, the device is sent to the dealers, doing this before they even figure the price. When the company is thoroughly convincd that the article is right, inquiry is made of the manufacturer regarding the amount of advertising to be expected of him.

The dealer receives the appliance with the joint assurance of the manufacturer and the jobber concerning its reliability, and his



Indiana Distributors of Illinois Electric Co. In a Get-Together Dinner in Indianapolis.

efforts are also backed by an extensive amount of publicity already established, which precedes and accompanies his own methods of advertising. The jobber also stands ready to assist him with information and advice regarding selling methods or any other business particulars he may require.

In analyzing business since the first of the year, the Illinois Electric Co. finds that it has been able to stimulate the sale of vacuum cleaners to a large degree, washing machines a little less extensively, and sewing machines last. These are splendid results, facing the fact that within this period the price has not been reduced on any of these articles. A reliable washing machine manufacturer advises that there is no possibility of a reduction in price very soon because the product cannot be produced at a lower cost and yet maintain the high efficiency required.

There is a great field for ironing machines, 85% of the household ironing being possible with this machine, leaving 15% for the work of the electric flatiron. So excessive a reduction in the drudgery of this class of work will make a large appeal to the housewife. It remains for the dealer to interest the customer in the advantages of the machine, for which the field is ripe. Only 2 or 3% of those owning washing machines have as yet purchased an ironing machine. It is quite as easy to place dishwashing machines, their labor-saving qualities being strongly apparent to the housewife who, with its use may wash the dishes but once a day, during which process she may be employed in making beds, dusting or other tasks.

The electrical appliance business is attracting many men to its ranks who have never before been connected with this trade but who have chosen this field because of the amazing possibilities for future results. Successful men with capital are investing their money and efforts in this business and it is predicted that 5 yrs. from the present time an electrical merchant who does not have a business worth at least $100,000 will be an exception.

With the use of electricity increasing for all practical purposes of every-day living, there is positively no limit to its future possibilities. Everyone is daily becoming educated to its uses in preparation for that greater time when other motive power will be unknown. To hasten this day dealers must awaken to their opportunities, salesmanship must take on a deeper educational method and consistently energetic efforts must be maintained.

MAY BUILDING OPERATIONS SHOW INCREASED ACTIVITY.

Reports From Various Parts of Country Indicate Gradual Return to Normal Conditions That Should Stimulate Electrical Trade.

Construction activity in May, according to figures published by the F. W. Dodge Co., was 9½% greater than in April. Contracts awarded in the 27 Northeastern states of the country during May amounted to $242,093,000, compared with $220,886,000 in April.

The increase in activity should have been greater except for widespread labor troubles. In New England and throughout the Middle West, where wage disputes have been pretty general, building activity kept up during May at about the same rate as in April. Substantial increases in activity were reported in the territory along the Atlantic coast from New York to South Carolina.

Residential building continues to lead all other classes. In May contracts for this class of construction amounted to $82,982,000, or 34% of the total. Public works and utilities amounted to $64,999,000, or 27% of the total; business buildings, $29,494,000, or 12% of the total; educational buildings $24,462,000, or 10% of the total; industrial buildings, $20,404,000, or 8% of the total.

Building activity of the first 5 mo. of the year compares very favorably with the same period of previous years. The total investment represented by building contracts let from Jan. 1 to June 1, has amounted to $839,357,000. At the end of January, activity from the first of the year to date was 6% behind the average for the preceding 5 yrs.; at the end of February, 11% behind; at the end of March, 4% behind; at the end of April, 5% ahead; at the end of May, 11% ahead.

The demand for new construction still continues strong. Contemplated new work was reported in May to the amount of $462,785,000, which is 18% greater than the amount reported in April.

During the first 5 mo. of the year more than $2,000,000,000 in contemplated new work has been reported. This is considerably more than double the amount of contracts awarded, and indicates the pressure of the demand for construction. It is to be hoped that the labor disputes now in evidence will be rapidly settled so that the summer months may witness a substantial increase in activity.

Contracts awarded in the New England states during the month of May amounted to $18,806,000, an increase of 5% over the April figures. Total construction contracts let in the first 5 mo. of this year have amounted to $65,208,000, which is rather less than the average for the same period in the preceding 5 yrs. However, activity this year has exceeded that of 1919, the previous year in which the economic factors affecting construction were most nearly like those of the present year. Included in the May, 1921, contracts were the following: $7,405,000, or 39%, for residential buildings; $3,585,000 or 19%, for industrial buildings; $2,617,000, or 14%, for public works and utilities; $2,280,000, or 12%, for business buildings. Contemplated new work amounting to $28,407,000 was reported in May.

In New York state and northern New Jersey, May building contracts amounted to $57,964,000, an increase of 14% over April. Of the May total 63% was for residential buildings. Contemplated new work was reported in May to the amount of $95,549,000.

Contracts let during May in the Middle Atlantic states comprising eastern Pennsylvania, southern New Jersey, Delaware, Maryland, District of Columbia, Virginia, North and South Carolina, amounted to $43,612,000, an increase of 60% over the April figure. Included in the May total were the following items: $13,098,000, or 30%, for residential buildings; $11,647,000, or 28%, for public works and utilities; $6,201,000, or 14%, for industrial plants; and $4,271,000, or 9%, for business buildings. Contemplated new work was reported in May to the amount of $89,107,000.

Contracts awarded during May in western Pennsylvania, West Virginia, Ohio, Kentucky and Tennessee, amounted to $41,295,000, which was slightly under the figure for the preceding month.

Business Methods for Handling Wiring Contracts

Standardization of Material Important Factor in Workmanship and Keeping of Records on Job—Convenient Forms Employed in Economically Tabulating Daily Costs of Labor and Material

By A. L. NELSON

Chairman, Subcommittee of Wiring Committee, National Electric Light Association.

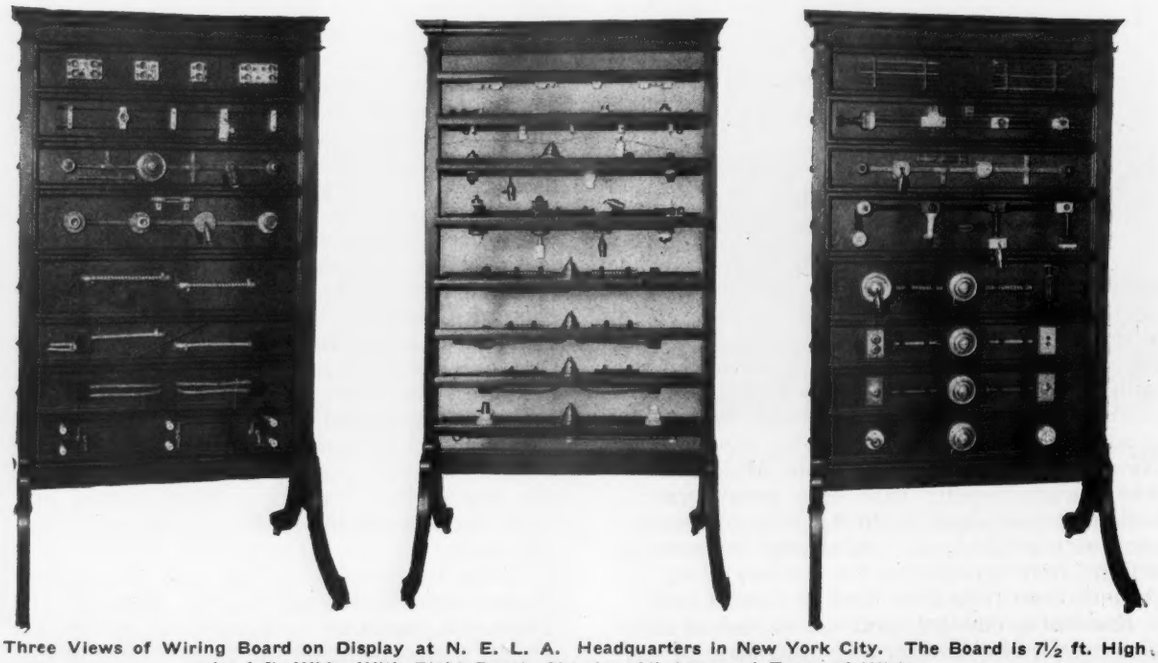
This is the last of a series of three articles on wiring, being a report to the National Electric Light Association on "Merchandising Plan for Selling Home Installations." The first article dealt with a plan for selling electrical wiring, or obtaining installations in the home. The second article covered the subject of proper quotations for house wiring. They appeared in the Feb. 26 and March 26 issues of "Electrical Review" respectively.—EDITOR'S NOTE.

The contractor, realizing that there are many things affecting his organization which tend to increase or decrease his cost of labor and material on the job as well as costs affecting his overhead, is continually on the alert to acquire or devise means or systems whereby nonproductive costs can be kept down and waste eliminated. With this in view, the intention of this article is to touch upon some of the more important things to be considered and to show forms and methods which can be employed in handling a contracting business in a businesslike way.

Standardization of material for the job is a very important factor. Nothing is more disconcerting to the wireman than to find new types of material on the job, especially material requiring special tools with which he is not provided. This reflects itself on the cost in a nonproductive labor charge. All experiments with materials should be confined to some special wireman whose tools, equipment and disposition will give such experiments a fair test.

When the job is completed the wireman should have a convenient form for listing material returned for credit. The stockroom then knows if all material left over has been received and the job properly credited. It is also essential that a complete bill of material be sent to the job by the foreman before men are assigned, in order to eliminate delay and loss of time in executing the work. It is very easy to overlook small or miscellaneous items on the first material order and in so doing the men on the job are immediately handicapped. Items missing, such as pipe straps, fish wire, ceiling boxes, bushings, etc., are an annoyance to conscientious men and hold up the work.

One accompanying form comprises a standard list of wiring material and tools needed, and is intended for use as a reminder and working sheet for listing and pricing material needed for the wiring job. Space is provided for the name, address, job number, date, etc., also for filling in of quantities and cost of various items. The matter



Three Views of Wiring Board on Display at N. E. L. A. Headquarters in New York City. The Board is 7½ ft. High by 4 ft. Wide, With Eight Panels Showing All Approved Types of Wiring.

of providing proper and necessary tools should not be overlooked and it is to the contractor's interest to see that the wiremen have the complement of tools which they themselves furnish.

Labor-saving devices often pay for themselves on the first job used and make for contented workmen. Wiremen on house wiring jobs should be provided with plaster cutters for outlets. This is a simple device and can be made from a ½-in. deep 4-in. ceiling box. This can be made up in the shop by cutting the edge of the outlet box into sharp points or teeth, and by bolting a bar at the back of the box for a handle. After the outlet is cut the plaster remains in the box instead of being scattered over the room as would be the case where the outlet is cut with a knife or chisel. Proper ladders and clean drop cloths are essential and are appreciated by the customer. House

DELIVER NOT LATER THAN____ INVESTIGATED BY _____ DATE_____

NAME_____ ADDRESS_____ JOB #_____

FOREMAN_____ SPECIAL_____

Q		COST	Q		COST	Q		COST
	½" Conduit			Amp.Plug Fuses			3/16x½" Stove Bl't	
				Amp.Link "			3/16x1" " "	
	½" Greenfield			3/8 Fixture Stud			Toggle Bolts	
				3/8 outlet clamp				
	14-2 wire BX			3/8 Box hangers			¼x1¾ Exp.Bl'ts.	
	14-3 wire BX			Switch Boxes			¼x2½ " "	
				Spacers				
	4" Ceil.Plate			SP.FL.Switches			Nails	
	4" " Box			DP FL. "				
	3" Junc. Box			3 way FL. "			Brads	
	4" " "			4 way FL. "				
	4" Square "			FL.Recep.Single			Gasoline	
				FL.Recep.Duplex			Lard Oil	
	4" Blank cover						Can	
	3" " "			Single Sw. Pl.			Saw Blades	
	4" Spider "			Double Sw. Pl.			Ft.Step Ladder	
	3" " "						Ft. " "	
	4" Drop Cord "			1/8 Key Socket			Ext. Ladder	
	3" " " "			3/8 " "			Vice	
				1/8 Chain "			Stock	
	Type F fittings			3/8 " "			Dies	
	" L "			Wall Key "				
	" R "			" Chain "			Drop Cloths	
	½" Locknuts			Rubber Bushings				
	½" Star Bush.			Drop Cord Canopies				
	3/8" Box Con.			Flexible Cord				
	½" " "			Shade Holders				
	Dup. " "			Lamp Guards				
	90° " "			Ball Adj.				
	45° " "							
				#12 Iron wire				
	½" Couplings			#14 RC wire				
	½" Pipe Straps			Ground Clamps				
				Trap Door				
	Min. Clips							
				Circular Loom				
	30Amp.ST.FE.SW			Friction Tape				
	60Amp. " " "			Rubber "				
				Solder				
	Plug cutouts			Soldering Acid				
	2 wire single			Candles				
	2 wire double			Porc. Bushings				
	3-to 2 wire "							
				1x5" FHB Screws				
	8x12x3½" Cab.			1x8" " "				
	10x18x4" "			1½x8" " "				
				2x8" " "				

Material Order Blank for Listing Materials, Tools and Equipment Required on the Job, with Columns for Showing Quantity and Cost of Each Item.

wiring cannot be installed without proper wireman's tools.

Necessity of Convenient Scheme for Tabulating Daily Costs.

The contractor is also vitally interested in keeping costs on his work. If he could know how his jobs stand from day to day in labor and material expenditures he would be working at great advantage. At first thought it may seem impossible to devise a convenient scheme for tabulating daily costs; that is, to know the cost of every job at 8 a. m. up to the close of the previous day. The practice, however, has been put in use, and if correctly employed by the contractor, will point out to him instantly those jobs which for some reason or other are running over the cost as originally estimated.

Forms, similar to those here described and illustrated, may be used for entering costs. The "Daily Cost Report" form is used for entering labor and material costs from day to day, as expended. Provision is made for estimated amounts of material from stock and material purchased direct from vendors. The reverse side is used for entering daily labor, the cost of which is transferred to the labor column with the material. As the bills are passed and stock material charged, the actual amounts are entered in the respective places along the side of the "Estimated Cost." Spaces are also provided for various items entering into the contract price to facilitate analysis of the job upon completion.

There is a time card made out each day by the wireman, giving name and address of job or jobs worked on that day, also job number, hours and expense. Labor costs are posted to the various job numbers as shown by the distribution in the time cards. The total hours and expense as shown for the period is used in computing the wireman's pay check.

There is a report kept daily by the foreman, showing comparison of labor and material costs from day to day and at completion of work, as compared with the original salesman's and foreman's labor and material estimates. This may be explained in detail as follows: From the contract may be entered the job number, name and address, number of men and number of days estimated for work, the salesman's contract price and the profit figured, also the foreman's estimated cost of labor and material and of profit. During progress of work actual labor and material costs are filled in and, with estimated additional amounts by the foreman, a daily labor and material balance and a final balance are derived. Space is also provided for entering the start and finish of the job and the time of call by the foreman.

The supervising foreman in touch with all jobs makes an estimate as the work progresses on each job, of the amount of labor and material required to complete the same. If on any day he is unable to visit the job he makes his estimate from the previous inspection or by telephoning the job or receiving a report from the job foreman. In this way the office receives a report on every job each day to enable a computation of the costs at 8 o'clock each morning.

Much can be said regarding the proper selection of men to make up the personnel of an organization. The success of any organization depends to

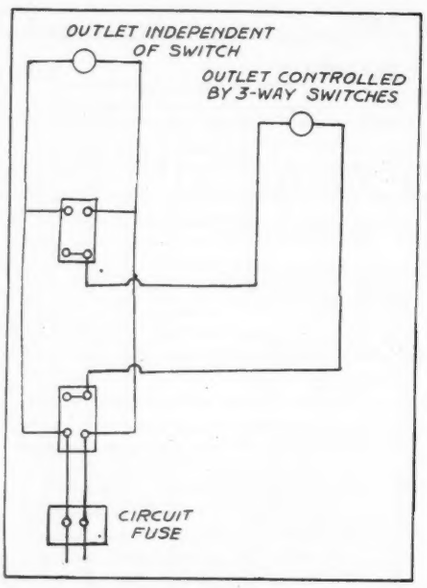


Diagram Showing Method of Wiring an Outlet With 3-Way Switches.

a great extent upon the type of men selected to operate it. The contractor should not only use care in the selection of salesmen for his house wiring department but should also make it a point to secure and train wiremen who are adapted to the work and who are agreeable and suitable to work in homes. It must be taken into consideration that the men are working continually under the eyes of the customer and recommendation for good work depends largely upon the quality of men who execute it. Working conditions should be made agreeable to such an extent that a suitable type of men will willingly specialize in this class of work.

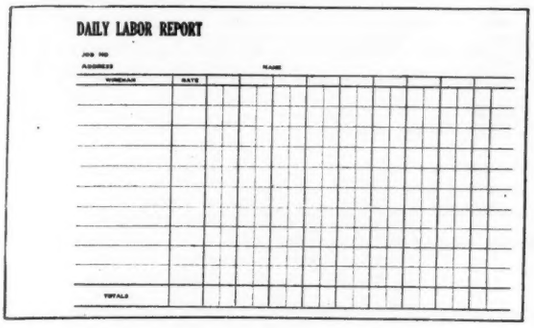
Methods, of course, vary with the different types of construction, but for work of similar kinds, standard methods may be adopted and followed. The subject, however, is one which calls for easy treatment and on which most construc-

FOREMAN'S DAILY COST REPORT FOREMAN _____ DATE _____ 19___

JOB NO.	NAME / ADDRESS	MEN: NO. / DAYS	MEN: TO-DAY / TOMORROW	TIME: START / FINISH	SALESMAN'S ESTIMATE: CONTRACT PRICE / PROFIT	FOREMAN'S ESTIMATE: COST / PROFIT	FOREMAN'S ESTIMATE: LABOR / MAT'L.	ACTUAL COSTS SEGREGATED: LABOR / MAT'L.	ACTUAL COSTS SEGREGATED: ADD'L. / ADD'L.	ACTUAL COSTS TOTAL: COST / MARGIN	BALANCES: DAILY LABOR / MAT'L.	BALANCES: FINAL LABOR / MAT'L.	INSP. TIME OF CALL

Detail of Blank Form for Foreman's Daily Cost Report.

tion men have their own ideas. It is suggested, however, that each contractor work out certain methods which are to be followed by his men so that at least he will be protected to the extent that they all work according to one method in place of each one of his own. What is considered good practice and followed by many contractors is to install the service, meter loops and cutout center first. This is excellent practice as it enables the central station company to connect the service while the men are on the job, and also gives the wireman an opportunity to test out the installation



Simplified Form for Daily Labor Report.

with the current on. After the service is installed all outlets are cut and all openings made throughout the building, starting on the top floor and working downward. The next procedure is to pull in the armored cable, working from the top floor down, after which outlet boxes are set and openings closed. The basement runs are made last, which includes picking up the armored cable runs and extending them to the cutout center. Modern practice tends to eliminate the taking up of floors and notching or drilling of joists in such cases where partitions, not being above each other, make this imperative. Soft pine floors in attics are not affected as these can be taken up easily. Armored cable is usually concealed back of the baseboard, the additional material used being more than offset by the saving in labor cost. This also has the advantage of executing the work quickly. Considerable skill is required in the taking up and replacing of hardwood or finished floors without damage to the flooring, whereas removal of baseboards is simple in comparison.

Carelessness and Lack of System Results in Costly Waste.

It is surprising to note the results which can be obtained by energetic foremen in a high degree of efficiency in the work of fishing, setting of boxes and fittings and opening and replacing of woodwork and trim. Good men are always willing to receive suggestions and can be made to conform to proven methods to effect economy.

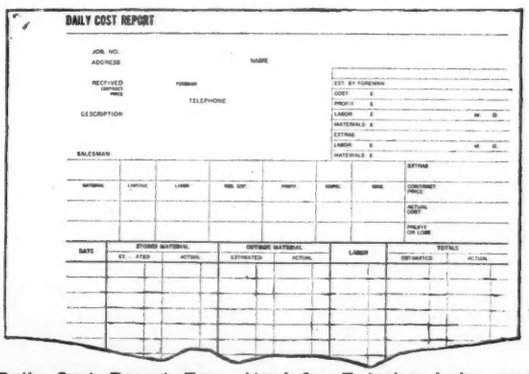
Careless layouts mean waste of material in unnecessary long runs. Also, the measuring of runs and cutting of BX by measure before installing, means one of two things. Cable is cut too long and stacked in the partition or ceiling, or cut too short, which means removal and recutting for a different run. Labor and material is saved by running armored cable from the coil then backing up and cutting off to actual requirements.

Many local codes now permit feeding a circuit through a set of three-way switches. This can be done absolutely without damage and at considerable saving in both labor and material. The installation of flush wall receptacles in the plastered wall just above the baseboard, is recommended as installation cost is considerably reduced over the cost of setting them in the baseboard.

The majority of small contractors spend a considerable amount of money by permitting the wiremen or helpers to call at the office or shop in the morning or during the day, or when they followed the old practice of reporting to the shop upon completion of each job to receive instructions for starting a new job. Ninety-five per cent of the present nonproductive labor expense can be eliminated by a simple system of work dispatching by telephone. The following methods are recommended as having been tried out and still in operation with much success:

The superintendent should arrange to have a complete material order, with necessary tools and equipment, delivered to the job one or two days previous to the time he expects to start. By the use of a card for each job, giving the names of the men who do the work, the day and hour of starting and the approximate date of completion, he can arrange with the help of the clerical force in the office so that, when the wiremen call by telephone for new assignments, they will be instructed where to report and the time of their leaving the old job be noted as closing that job.

This work dispatcher's card, just referred to, is typed immediately upon receipt of the contract and shows job number, address, name and date contract is signed; price, foreman, description of work, etc. This card is intended for use in a visible file and spaces are also provided for entering of date that material is ordered, when delivery is made and the date the work is started. Information such as wireman's name, estimated time, date completed, when permit is applied for, inspection ordered, certificate of inspection received, bill rendered, extra signed, telephone number of customer, reason if holding, complaints and remarks; in fact the card contains a complete history and permanent record of the wiring job. The



Daily Cost Report Form Used for Entering Labor and Material Costs From Day to Day.

tab, which can be detached, is used in applying for permit and is provided with space for date, signature, check number covering inspection fee and job number. The whole scheme provides a means of knowing how each job stands each day and absolutely eliminates any guess work as to costs and status.

Any material necessary to take care of extras

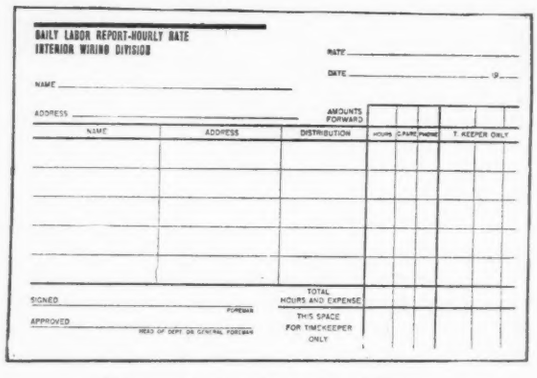
or other contingencies should be requested by wiremen by telephone, and with sufficient time allowance to permit this material to be delivered by boy or wagon so as to eliminate the holding up of any work. Any difference arising on the job which requires the attention of the superintendent should be telephoned in to the office so that the superintendent keeping in touch with his office by telephone will receive it within a reasonable time.

It is possible for a contractor to run his job very much in the same order that a factory operates under a daily cost system. The foregoing forms, showing model work dispatcher's card and cost system forms, if properly handled will enable the contractor to supervise his work in dollars and cents and concentrate his attention on work which is running close to or above the margin of the estimated cost.

The contractor, of course, in the pursuit of his business must give due consideration to the important part which he plays with relation to customer and central station. Except in cases where the customer retains an engineer to represent him he is probably not well informed regarding routing and methods pertaining to the electrical installations. It is, therefore, essential that between the central station and contractor he should receive proper advice concerning the necessary procedure to meet requirements of all parties concerned in obtaining that which he desires and is paying for.

In the first place, the contractor should secure a permit from the city to make the proposed installation, or should give information to the customer as to how to secure such permit in case a permit is necessary.

While the matter of application or contract for electric service, also location of service outlets and class of service, is naturally business between the central station and customer, the contractor should inquire from the customer if these points


DAILY LABOR REPORT-HOURLY RATE
INTERIOR WIRING DIVISION

RATE _____

NAME _____ DATE _____ 19__

ADDRESS _____ AMOUNTS FORWARD

NAME	ADDRESS	DISTRIBUTION	HOURS	CAR/FARE/PHONE	T. KEEPER ONLY
		TOTAL HOURS AND EXPENSE			

SIGNED _____ FOREMAN

APPROVED _____ HEAD OF DEPT. OR GENERAL FOREMAN

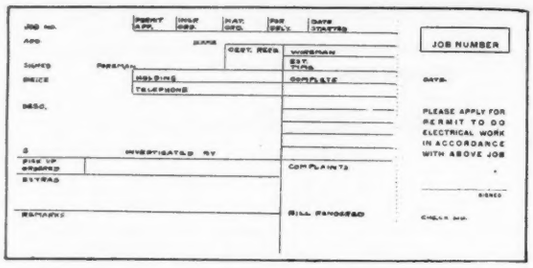
THIS SPACE FOR TIMEKEEPER ONLY

Wireman's Daily Time Card Form.

have been settled and, if not, handle this business with the central station for the customer, or advise him what action to take; whichever is preferable in the particular case. Where the contractor's knowledge or judgment is positive as to class of service and location of outlets, where the central station regulations are plainly understood, he should be in a position to submit to the customer, and properly fill in a blank provided by the central station for the purpose of making application or contract for electric service. In any case, the contractor should make it a definite point to see that the customer is brought in contact with the central station, for if these matters are delayed until the work of installation has been completed, there will invariably be a delay in the central station getting service connected.

With the above points settled, the contractor is in a position to proceed with the installation and the central station to proceed with work preliminary to "cut-in" such as line extension, etc.

If the job is of major proportion, the central station and contractor should keep in touch as to probable time of completion, etc., so that the serv-



Work Dispatcher's Card for Tabulating Complete History of Each Job.

ice may be cut in as soon after completion of installation as possible. However, before the central station is permitted to cut-in, it is necessary to obtain proper inspections and approval.

The contractor is under direct obligation to obtain inspection by the city and to see that the city sends the certificate of approval to the central station authorizing service to be connected. As soon as this certificate is received, the obligation is then passed to the central station to connect to its service, and it is then the central station's duty to set the meter, inspect the installation and connect to the customer's wiring.

The contractor is not only under obligation to the customer to do his work in such a manner as to obtain city certificate and central station approval, but to meet the fire underwriters' requirements. Inspection by the Underwriters' Bureau should be invited at the same time as the city certificate is requested; but, of course, this would be different for different cities.

Close attention and co-operation between central station and contractor is essential in all these matters in order that misunderstandings are eliminated and good service to the customer may result.

In addition to the routine of each individual case, the contractor, in order to give good and profitable service, must be familiar with the central station's regulations as to types of motors and various apparatus permissible on its system. Also, he must be informed as to the proper voltage of lamps to be supplied for specific districts. If the proper relations between the central station and contractor exist, both will exert every effort to satisfy their mutual customer.

Consul Thomas R. Owens reports from Bagdad, Mesopotamia, that the power stations in Mesopotamia are owned and operated by the government of occupation. The plant at Bagdad is larger than those at Basra and Mosul, but all are similar. The general capacity of the plant of the Bagdad central power station is 700 kw. now operating, and 500 kw. additional being installed.

Alternating-Current Controllers Automatically Operated

Twelfth of a Series of Articles on Principle and Application of Motor-Control Apparatus—Squirrel-Cage, Slip-Ring and Synchronous Motors—Types of Starting and Regulating Devices

By G. J. KIRKGASSER and E. W. SEEGER

Alternating-Current Automatic Controllers.—Automatic controllers for a-c. motors are built in a number of different types. Different designs are required not only for different service conditions, but because of the fact that the several kinds of motors must be handled differently. The methods employed for obtaining automatic acceleration are, in general, the same as those used with d-c. apparatus.

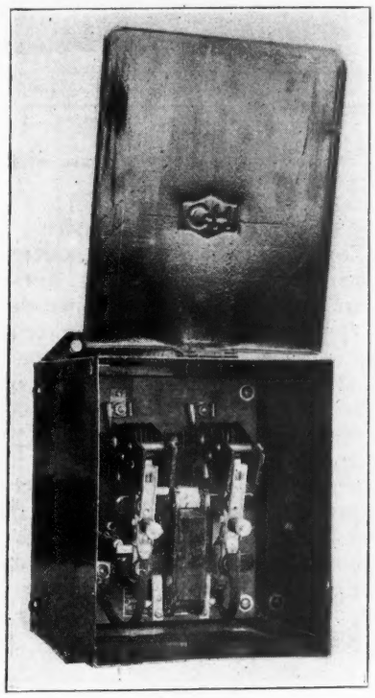


Fig. 93.

Small automatic starter for a-c. motors, which is really a 2-pole magnet switch mounted in an inclosing case. Connection for this type of apparatus with a 3-phase motor is shown in Fig. 94.

A great many a-c. motors can be connected directly to the line for starting, and for these motors all that is necessary is a magnetic switch. A 2-pole switch is usually used for single-phase motors, and a 2- or 3-pole switch for polyphase motors.

Time-Limit Acceleration.—Time-limit acceleration is used quite extensively for a-c. service and has been applied to starters for practically all types of motors. Motors are frequently used for obtaining the timing, but nearly all controllers of this kind are of the dashpot type. An a-c. solenoid pulling against a dashpot is a very noisy device, and in addition the timing is liable to vary. For these reasons in the more recent designs of a-c. controllers the solenoid lifts a weight which in dropping is retarded by the dashpot. Another advantage of this type of construction is found in the fact that the timing is independent of voltage variations.

Current-Limit Acceleration.—Next to time-limit, current-limit acceleration is the most frequently used, series relays in the primary circuit being used for both squirrel-cage and slip-ring motors. They are also connected in the secondary circuit of slip-ring motors. It is possible to obtain current-limit acceleration by means of lockout relays placed in the secondary circuit. These relays are similar in construction to the lockout switches used with d-c. equipment.

Other Methods of Acceleration.—When the motor to be controlled is driving a d-c. machine, as on motor-generator sets, a voltage relay is sometimes connected across the armature terminals of the d-c. machine and the acceleration of the a-c. motor is controlled by the counter electromotive force of the d-c. machine. Clocks and watt-hour meter movements have also been used where extremely long times were required, but these methods have not come into general use.

Frequency-responsive relays connected in the field circuit have been used for controlling the acceleration of synchronous motors, and it is also

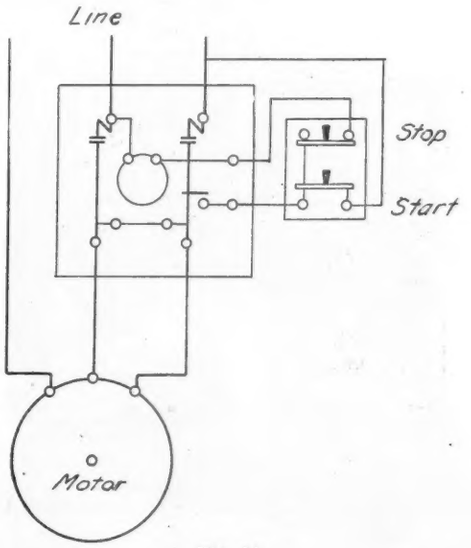


Fig. 94.

Connection diagram for double-pole magnetic switch used to throw small a-c. squirrel-cage motor "across-the-line." Also indicated to show how push-buttom station, or several stations, may be used for starting and stopping a motor so equipped.

possible to use frequency relays for controlling the acceleration of slip-ring motors. This type of control is, however, more complicated than series relay. It has no practical advantage over

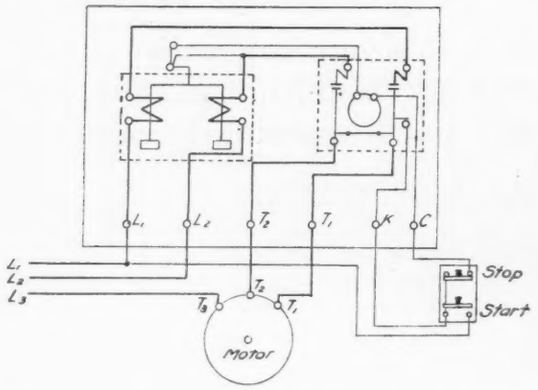


Fig. 95.

Same type of double-pole magnet switch as that shown in Fig. 94, but with double-pole overload relays used in the circuit for protection.

the series-relay type and is therefore not used on commercial controllers.

Across-the-Line Types of Controllers.—Fig. 93 shows the construction and Fig. 94 the connections of an automatic controller of the across-the-line type. This starter is merely a double-pole magnetic switch and can be used with either polyphase squirrel-cage or single-phase self-starting motors. Fig. 94 shows the starter controlled by two normally open push buttons, but it is also possible to obtain remote or automatic control by means of snap switches, float switches or other pilot devices. Fig. 95 shows the connections of the same type of starter equipped with an inverse-time-element overload relay. This overload relay is equipped with an adjustable dashpot which prevents the relay from tripping on the starting current, which is of short duration, but allows it to trip on a continued overload.

Fig. 96 shows another starter which performs the same functions as the one described above.

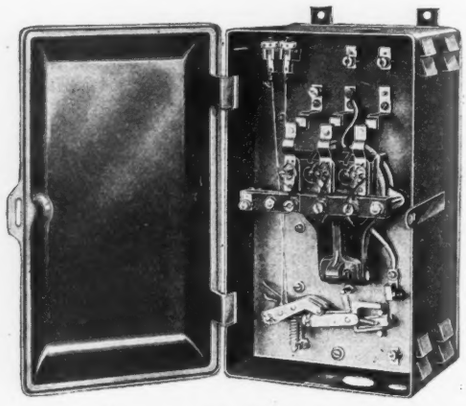


Fig. 96.

Another starter similar to that shown in Fig. 93, except that the overload device is of the hot-wire type.

With this equipment current is passed over the conductor shown on the front of the panel. In case of overload this conductor heats and expands and causes a pilot contact to be opened, which in turn interrupts the circuit to the coil of the magnetic contactor.

Primary-Resistor Starters.—Primary-resistor starters are used with squirrel-cage induction motors and with some single-phase motors. They have been built in both the current-limit and time-limit types, but the time-limit type has been found

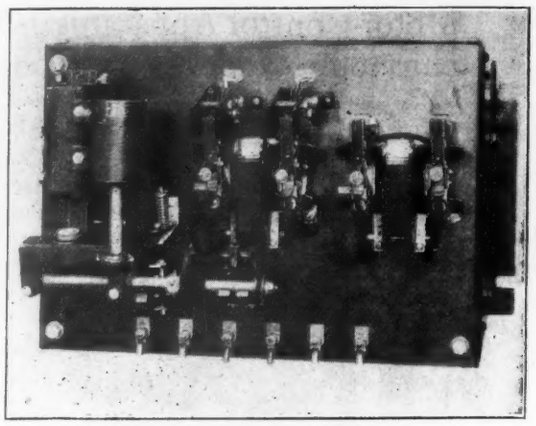


Fig. 97.

Primary-resistor type of starter for use with squirrel-cage induction motors.

to be more satisfactory for this service. The construction of a primary-resistor starter for a 3-phase motor is shown in Fig. 97, and the connections are shown in Fig. 98. When the "start" button is pressed a circuit is completed for the time-relay coil T which immediately operates and lifts the bar I until it touches the finger numbered 2. The circuit is then completed to the coil of the main switch M which closes and starts the motor with the resistors R_{11}-R_{12} and R_{21}-R_{22} in circuit. As the main switch closes the circuit between the fingers 3 and 4 is broken, thus opening the circuit of the coil T and the time relay starts to descend, but is retarded by the dashpot D. This dashpot is adjustable and in this way the starting time can be varied. Just before the bar I reaches its lower limit it makes contact with the finger 5, thus com-

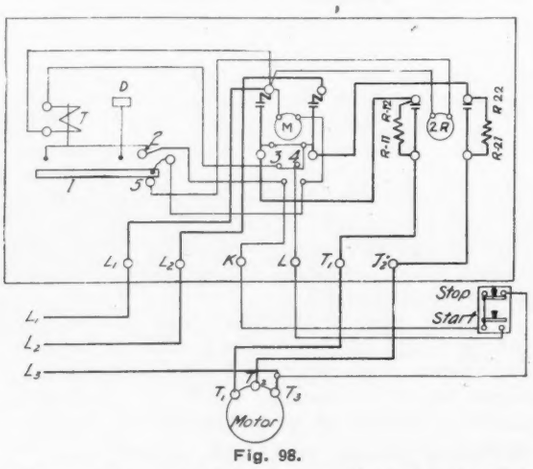


Fig. 98.

Diagram of connections of automatic starter shown in Fig. 97.

pleting the circuit of the coil $2R$, and this switch in closing cuts out the starting resistance.

Primary-resistor starters should not be used on equipments which must start up under load because the torque at starting is low, but such

devices are satisfactory on motors starting light and on fans and centrifugal pumps.

Auto - Transformer Starters. — Auto-transformer starters are usually built with time-limit acceleration although current-limit is also used by some manufacturers. Either three Y-connected transformers or two V-connected transformers may be used, the results obtained being the same. The V connection, however, requires less switchgear and is usually preferred. Fig. 99 shows the connections of an auto-transformer starter with time-limit acceleration and with two V-connected transformers. This particular controller is also equipped with inverse-time-element overload relays. When the "start" button is pressed the time relay is energized, which closes and picks up first the switch S_2 and then S_1. Switch S_1 connects the transformer to the line and S_2 connects the motor to the starting tap (usually 67%) of the transformer. When switch S_1 closes the time relay is de-energized and falls, and after a predetermined time S_2 is dropped out and S_3 closes and

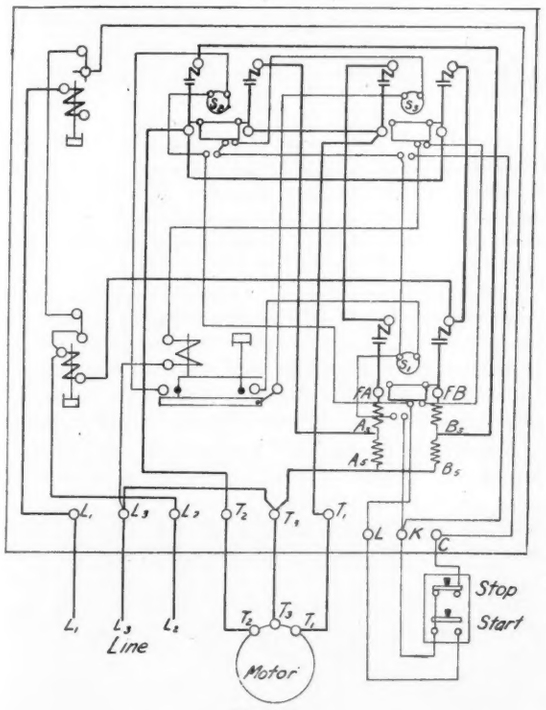


Fig. 99.

Connections for automatic auto-transformer type of starter. The two transformers are connected in open-delta, and the acceleration is governed by time-limit relays.

connects the motor directly to the line. S_1 is then dropped out and the transformer is disconnected.

The starter described above is designed for use on low-potential circuits (up to 550 volts). There is an increasing tendency, however, toward higher voltages for large motors and Fig. 101 shows a 2200-volt transformer-type starter. In this case a 5-pole oil contactor is used for making the starting connections, and after a predetermined time this switch is dropped out and a 3-pole contactor connects the motor directly to the line. A step-down transformer is used with equipments of this type for reducing the voltage on the pilot circuits.

Secondary-Resistance Starters.—A secondary-resistance starter of the time-limit type is shown in Fig. 102. The operation is similar to that of other time-limit starters which have been described. The time relay is energized and in turn completes the circuit to the coil of the main switch; the main switch closes and starts the motor with all the secondary resistance in circuit. When the main switch closes it also interrupts the time-relay-coil circuit and the relay falls, bringing

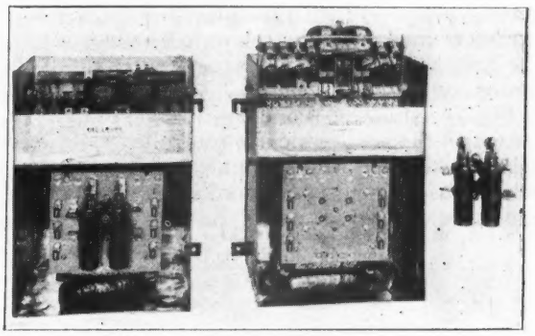


Fig. 100.

Automatic type of auto-transformer made by Industrial Manufacturing Co.

in the accelerating switches one after another until all the resistance has been cut out and the motor is up to speed.

Fig. 103 shows the connections of a controller with series relays in the secondary circuit. This controller was designed for 2200-volt service, so the main contactor is oil immersed. When the push button is pressed the main switch is closed, starting the motor with all resistance in the secondary circuit. When the motor is connected to the line the initial current peak in the secondary causes the series relay R_{11} to operate and break the circuit to the coil R_2, thus preventing its closing. When the current decreases to a pre-

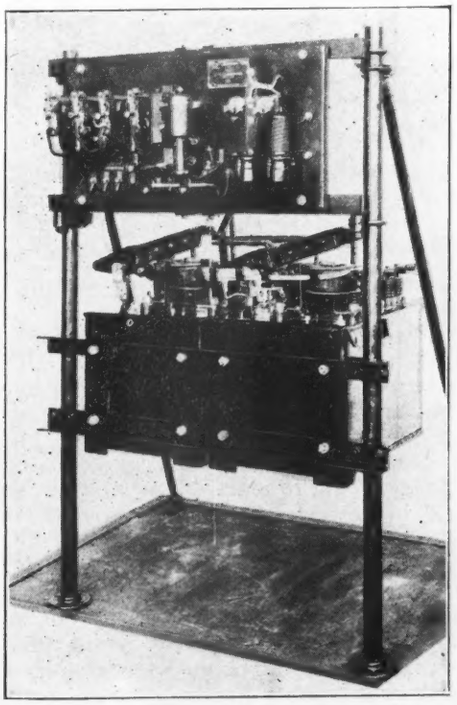


Fig. 101.

Automatic auto-transformer type of starter used with high-voltage squirrel-cage motor. Acceleration is governed by a time relay.

determined value the relay R_{11} closes and allows R_2 to close. Another peak of current is then obtained which opens relay R_{12}, and so on until the motor is brought up to speed.

Lockout-relay controllers are similar in operation to the series-relay type. When the main switch closes, an initial peak current is obtained in the secondary which locks out the first accelerating relay. When the current decreases to a predetermined value the relay closes and brings in the first accelerating switch, and so on until the motor comes up to speed.

Fig. 104 shows a secondary-resistance controller on which the acceleration is controlled by a series relay in the primary circuit. If a single-phase relay is used it must be placed in the primary because its operation would be affected by the

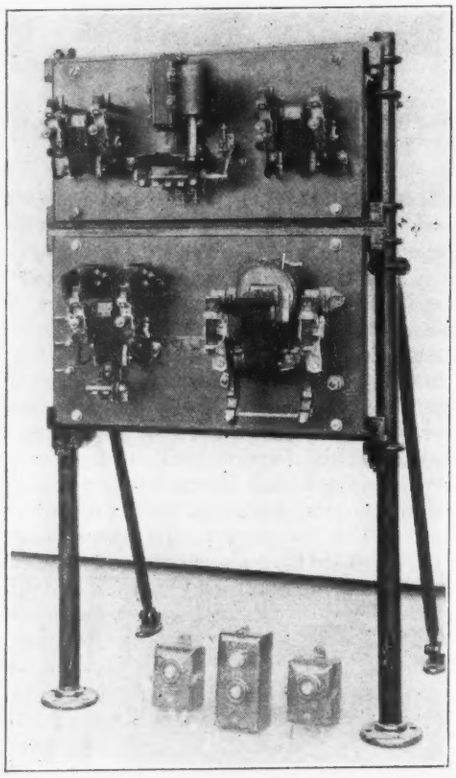


Fig. 102.

Automatic starter used with slip-ring motors, in which the resistance of the motor secondary is cut out during starting by the automatic switches on the starter panel.

changing frequency of the secondary circuit. The 3-phase series relay is not affected in this way.

Determination of Number of Accelerating Contactors.—The number of accelerating contactors used on a secondary-resistance controller depends upon the allowable peak currents and also upon the amount of starting torque which can be exerted by the motor without damaging the driven machinery.

Fig. 105 shows the starting curves of a slip-ring motor with different numbers of accelerating switches. It will be noted that with one switch, as indicated by curve *A*, the starting torque is about 250% of normal. One accelerating switch is usually satisfactory for small motors, but is seldom used with motors rated above 10 hp.

When two accelerating switches are used the starting torque is 200% of normal. With three accelerating switches the starting torque is 190%, as indicated by curve *B*, and with four switches the starting torque is roughly 180%. With six switches the torque is about 160%, as shown by curve *C*.

Two accelerating switches are ordinarily used with motors up to 40 hp., and three switches up

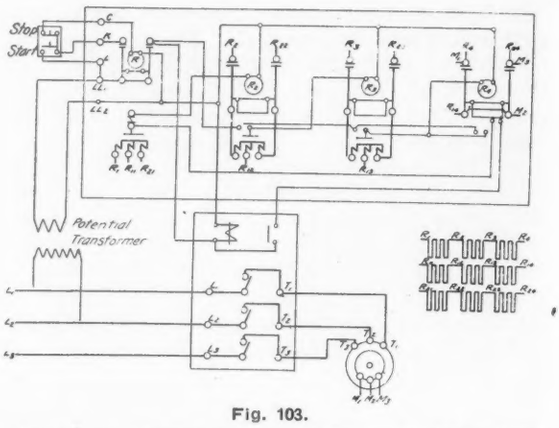


Fig. 103.

Connection diagram of a controller for a high-voltage slip-ring induction motor secondary-resistance method of starting.

to 75 hp. For ordinary purposes four accelerating switches are used up to 200 hp., and five or six switches above that capacity. It is practically impossible to obtain satisfactory series-relay operation if more than six accelerating switches are used.

Curve *D* shows why it is possible to use fewer accelerating switches for centrifugal pumps or other light starting service. Although only two accelerating switches are used, the starting current and torque obtained is about the same as is obtained for three switches with full-load starting.

Synchronous-Motor Automatic Starters.—Automatic starters for synchronous motors have been used quite frequently where the motor is used as one unit of a motor-generator set. For this service a time-limit controller is satisfactory because the load is light and the motor can be synchronized without difficulty. For installations where the motor must start under partial load, or

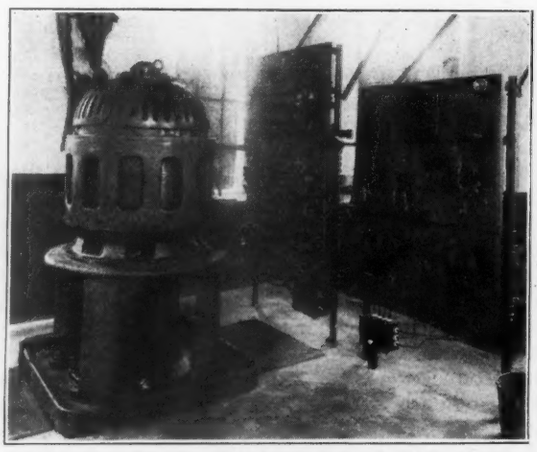


Fig. 104.

Secondary-resistance automatic controller with acceleration governed by series relay in the primary circuit. One of the panels is used with the Lincoln motor driving a centrifugal pump. The other is used with a smaller equipment.

where the starting time is long, as on an ammonia compressor with a flywheel which must be accelerated, time-relay acceleration is not satisfactory. Current-relay acceleration has also been found unsatisfactory because the primary current pulsates and uniform results cannot be obtained.

The use of frequency relays in the field circuit is practically the only method which can be depended upon. The frequency of the current in the field circuit during starting is dependent directly on the speed, and if relays are provided

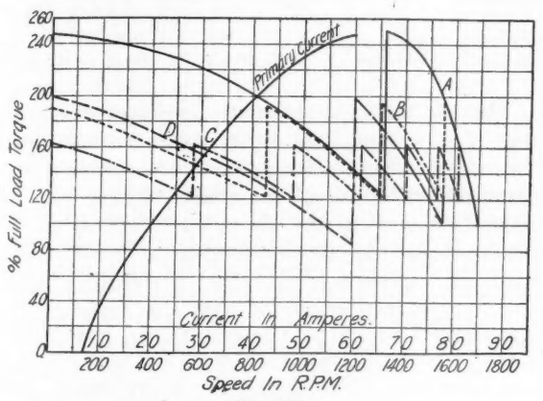


Fig. 105.

Starting curves of a slip-ring motor, indicating how different numbers of accelerating switches effect the starting current and torque.

which operate at a predetermined frequency, uniform and satisfactory results can be obtained.

Synchronous motors are usually started by the auto-transformer method. When the pilot device is operated the starting switch is closed and the motor starts as an induction motor on reduced voltage. As the motor speed increases, the frequency in the field circuit decreases and at a predetermined value a frequency relay operates, dropping out the starting switch and energizing the running switch. As the motor speed increases still further a second relay operates which controls the field switch. On some controllers the field switch is closed before the running switch, and in this case a combination of time-relay and frequency-relay control is used.

Reversible automatic starters are quite common, but are used principally for elevator and mill service and will be described later. Starters of the speed-regulating and speed-setting type are used most frequently for printing-press service which is to be discussed later. There are several other special applications which will be described in connection with the industry with which they are used.

SUCCESS OF COMPLETE LINE PLAN IN MERCHANDISING.

Members of the electrical retail fraternity are taking a lot of interest in the doings of The Gunsett Co., Van Wert, O. The Gunsett Co. is one of the pioneers among the 100% Western Electric appliance dealers. Although only organized in 1917, the Ohio concern sold more than $10,000 worth of electrical household devices last year in a town of less than 8000 people.

The Gunsett Co. did not carry a single electrical appliance when it was established. G. F. Bertke, a member of the Western Electric organization at Cleveland, suggested that the Van Wert company specialize on the appliances of his firm with the idea of "selling the entire line." That the idea worked is evidenced by the fact that Van Wert seems to be doing its best to carry the Gunsett appliance sales of this year far beyond the remarkably good figure made during 1920. Those interested in the "complete line movement" maintain that it is the best sort of an advertisement in smaller cities of the same type as Van Wert.

Exhibit of The Gunsett Co., Displaying the Western Electric Co. Line at County Fair, Van Wert, O.

Selling the Electrical Idea to Self and the Public

Story of Organized City-Wide Educational Effort and What It Is Doing to Promote Use of More Electricity and Electric Conveniences — Work of Cleveland Electrical League This Year

By WILLIAM C. CAMPBELL*

In the United States last year the retail sales of electrical appliances, exclusive of wiring and lighting supplies and such special devices as illuminated signs, amounted to $223,250,000. Possibly the *World Almanac* and the U. S. Census Bureau—if they don't already know it—would be interested in that. But the figure, standing alone, cannot be expected to thrill anybody else. Only when it is subjected to certain calculations does it begin to bid for a wider interest.

The population of the United States, roughly, is 110,000,000. Now divide that $223,250,000 by 110,000,000 and you get a quotient of something over $2. For convenience, call it an even $2. That $2 represents the average quantity of electrical appliances purchased by each individual consumer in the country last year. If you are a retailer of electrical appliances and if you know the population of your city and town and the proportion of the community's electrical business that you should get, you can start with that $2 and figure on the back of an envelope how closely you approached your sales quota in 1920.

It was just such a mathematical process that started something in Cleveland a few months ago. J. E. North came to town to take the job of commercial agent for the Cleveland Electric Illuminating Co, which is the central-station utility of the city. In a fraction of a year his presence in Cleveland had accomplished two things: about half the population of the city, seemingly, had come to call him "Jack"; and the electrical manufacturers, distributors, contractors, wiremen and retailers of electrical appliances had been joined in one big city-wide, aggressive, $50,000 campaign to sell the people of Cleveland and environs to the number of 1,000,000 on the use of things electrical. And almost any business man, whether he be a manufacturer, wholesaler, jobber or dealer and whatever be his "line," might conceivably be interested in the technique and the method of that big selling job.

The situation, briefly, was this: The Cleveland Illuminating Co., which, because of its interests and because of its facilities and its resources, might be expected to take the lead in all efforts to promote the use of electricity, had grown so big and the makers and distributors of electrical appliances had become so numerous that the central station on the one side and the manufacturers and sellers on the other had lost direct contact with each other. Mr. North came into the employ of the company to create the job of commercial agent and to re-establish that broken contact.

*From March *Business*.

The electrical contractors, wiremen and retailers, it is true, had their organizations. But the organizations were associations within those respective divisions of the trade. There was no federation and, in the absence of federation, of course, there was no united effort. The first step was the formation of that theretofore nonexistent federation and it took the form of the Electrical League of Cleveland. In the league were joined the manufacturers, the jobbers and the Cleveland Illuminating Co. individually, and these organizations: the Electrical Contractors' Association, the Residence Wiring Association, the Electrical Dealers' Association and the Lighting Fixture Dealers' Club. The affairs of the league, it was arranged, were to be administered by a board of directors, a members' council and the necessary standing committees. The league established permanent quarters on the top floor of a hotel building.

Thus constituted and thus established, the league went to work. Cleveland was below its quota in the sales of electrical goods. An analysis early revealed the cause—lack of education. Primarily, the public was not sufficiently educated in the use of electrical appliances. Secondarily, the electrical appliance men themselves were undereducated in the use of modern business methods; at least they were not applying these methods to any amazing degree.

Besides, there had been an absence of effective co-operation among the several divisions of the trade and even among the units and individuals within those divisions. This absence of effective co-operation among electrical retail men, by the way, was a condition by no means peculiar to Cleveland. To be specific and to cite just two instances:

Consider the electrical ironing machine for household use, a comparative newcomer on the appliance market. The manufacturer of that machine knew how an electrical ironer, unusual and even incongruous as it might at first seem as a household utensil, could be sold to the average householder. Before he started making the machine the manufacturer had to determine whether it would be salable to the possible ultimate consumer, and in deciding that question he had to figure out just how it might be sold. But, did the manufacturer devote any great amount of thought and effort to the job of teaching the retailer what he, the maker, had learned about selling the machine to the householder? Well, not any tremendous amount.

Consider the average electrical contractor, fig-

uring on a household wiring job. What is his main purpose? To win that job. To win it against competition he must hold his estimate to a minimum. Extra outlets in walls and baseboards—the extra outlets that are essential if that household is to be sold on the use of electrical appliances—cost extra money. Result: the average electrical contractor in Cleveland, just as do his brother contractors in many another community, laid out each job with an irreducible minimum of outlets for lighting fixtures. And thereby he raised another obstacle to the sale of electrical goods.

The selling job for the league, then, was twofold, and both of its phases, it was seen, were to be educational. One phase was to be directed at the public. The other educational phase was to be directed at—the league, itself!

Thus was born the Cleveland Electrical Development Campaign. To finance that campaign there was raised that fund of $50,000. The fund was budgeted and the campaign was laid out as to divisions as follows: general publicity, $10,000; story contest, $5000; scholarship contest, $5000; modern electrical homes exhibit, $12,000; industrial lighting exhibit, $8000; school for salesmen, $5000; office salaries and equipment, $5000.

General publicity, of course, constituted a matter to be taken up with the editors of the newspapers. The Cleveland papers had had "electrical pages." But those pages had been filled with—well, just filled with almost anything that had anything, however remote, to do with electricity. Much of the "copy" was technical beyond the understanding of the average lay reader; little of it had any local interest. First, then, the newspapers were sold on de-technicalizing their electrical pages and printing local electrical news. In this textual transformation the league gave aid by furnishing the papers with local electrical information.

Next, it was necessary to enlist the aid of the newspapers specifically in the two contests, the story contest and the scholarship contest, two phases of the campaign that were to be conducted directly through the public prints. Finally the newspapers were enlisted in the campaign as a whole, to the end that, by giving intelligent publicity to all of the activities of the league, they might aid in making business in Cleveland better.

The public's first contact with the electrical development campaign was through the story contest. Announcement was made through the newspapers that a $65 electric vacuum cleaner would be given as the first prize for competitive letters on the advantages of the use of an electric washing machine in the home. That first announcement brought in 166 letters. The prize-winning efforts, of course, were published with due display and another contest, centering about another electrical appliance, immediately got under way. The story contest was designed to be divided into weekly stages, with a new contest and a new set of prizes each week. When the letter-writing warfare ended it had centered about every electrical appliance in every room in the house, from the kitchen to the vestibule and from the basement to the attic.

"Incidentally," Mr. North pointed out, "besides awakening public interest in electrical appliances, those letters had an effect that we hadn't anticipated. Many of them revealed ingenious thought; they were admirably done and accompanied, frequently, by drawings and blue prints that might have come from the drafting table of an engineer. They opened our eyes to new uses of electrical equipment and to new sales possibilities!"

The scholarship contest, more ambitious in conception, broader in scope and planned as a supplement to the story contest, was just getting under way when this article was written. First, there was to appear in the newspapers a series of 26 electrical lessons. Each was to be not more than 850 words in length, written in non-technical language by a volunteer specialist from among the league membership. Each was to deal with some phase of the subject of electricity and its uses that affects the average man and woman. Supplementing the newspaper publicity, booklets were to be distributed among the 30,000 students in the public and parochial high schools of Cleveland, from among whom would arise the scholarship contestants. At the end of the course of published lessons, high school students were to be invited to enter a competitive, city-wide electrical examination that would cover the lessons and that would have as its capital prize a 4-yr. scholarship, worth about $800, in the Case School of Applied Science in Cleveland, and some 33 additional prizes ranging in value from $200 down to $25.

Progress of the Campaign for Teaching Uses of Electricity.

"What's the value of that?" I asked Mr. North, referring to the scholarship contest.

"Inducing people to think about electricity and its household uses," he explained. "With the contest we expect to interest not only the contestants, but their parents and older brothers and sisters. Besides, we are looking forward to the time when these high school students will have grown up and will have acquired homes of their own and thus become customers for electrical appliances."

One way to sell householders on electrical possibilities was through the printed word, as in the story contest, the scholarship contest and the general publicity that attended the whole Cleveland campaign. Another way was through demonstration. Recently there was opened in different parts of Cleveland three modern and model electrically equipped residences as public exhibits. The houses, which cost $10,000, $30,000 and $70,000, respectively, were erected by real estate operators. They were furnished and decorated throughout by Cleveland furniture and decorating concerns and wired and electrically equipped by the Electrical League and in accordance with the league's enlightened standards of design and equipment. Then they were thrown open for public inspection and for personal demonstration by the league's own representatives.

So much for the education of the public. But the curriculum of instruction is not yet complete.

Industrial lighting—the illumination of offices, stores, shops, factories—is a closed book, an uncharted sea, an unexplored continent, or whatever

figure you prefer to symbolize something almost untouched by investigation and study and thought, and something in which all three of these are most urgently needed.

It is for the education of Cleveland employers that the Electrical League has set up at its headquarters an industrial lighting exhibit, a laboratory scientifically equipped with light-measuring devices for the visual demonstration of industrial illumination as it should be. Employers on a wholesale scale—some 1500 manufacturers, for instance, were invited to a series of dinners in the league quarters. Each of these dinners was followed by a lecture and a demonstration, by some recognized expert, on industrial lighting. To supplement these lectures and demonstrations and to tie this phase of the campaign to the marketing of electrical appliances, the league gave the services of lighting engineers to employers who asked for personal surveys of their plants and recommendations for solving their lighting problems.

Internal Education in Electrical Matters for Men in the Industry.

And now there remains the Electrical League and its own self-education. First there are the matters of broad instruction, fundamental things such as the relations among the divisions of the electrical trade, the principles of business management, salesmanship and the like, that are of interest and have some effect upon the commercial lot and condition of all members of the league. Then, too, there are the matters of specialized education, "brass tack" instruction that an individual member may apply to his own individual business or to his own day's work.

Every month, on the evening of the fourth Wednesday, the league has a general educational meeting. At this gathering it sits—figuratively, at least—at the feet of some authoritative preceptor of modern-day thought and practice and listens to what he has to precept. At these meetings such subjects as these are covered: Ideal relations between the jobber, contractor and dealer; salesmanship; recent progress in electric-fixture design; advertising; inside information on the problems of the manufacturer, jobber, central station, contractor and dealer; window display and store arrangement.

Window display and store arrangement—that's where the retailer lives. And after all, the man who holds the key to the whole merchandising situation, whether the merchandising be of electrical appliances or apples, is the retailer. The solution of his problems today constitutes the biggest and most vitally important task confronting the manufacturer, the wholesaler and the jobber whose goods he sells. The Cleveland Electrical Development Campaign has stopped to think about that; and then has gone ahead and done something about it. The campaign has undertaken to help the retailer with his problems. It has gone into his place of business with him and has started with his display windows and gone through his store to his own little private office back at the rear end.

The display-window end has not been so serious. Admittedly, electrical goods the country over are generally well displayed in the windows of the retailers. Electrical appliances lend themselves readily to beautiful, instructive, or spectacular and attention-drawing effects. The majority of dealers handling them have availed themselves of those inherent advantages of the merchandise. But Mr. North—yes, the same "Jack" North, and he is chairman, by the way, of the Electrical League's members' council—Mr. North believed there was room for improvement in electrical window display in Cleveland. He thought out a plan by which improvement could be effected. That plan, because it proved not only self-starting, but self-propelling and self-sustaining, is interesting. Mr. North laid his plan before an expert window dresser whom he happened to know, C. B. Moore, then employed by a Cleveland department store.

"I think I can set you up in a nice business of your own," Mr. North told Mr. Moore, in substance. "Come on around with me and we'll call on some of the electrical retailers."

Together they made a canvass of retailers of electrical appliances and presented to each of the dealers a proposition by which Mr. Moore was to take over the window trimming of the store on a contract basis at so much per window, or—as the arrangement later was modified—at so much per square foot of window space. The dealers signed up, most of them with eagerness. Mr. Moore resigned his department store job. You can see the effects of his work on any business street in Cleveland.

Evolution of Present-Day Contractor-Dealer as a Business Man.

On the average, the retail dealer in electrical appliances is a unique business man. The average drug store proprietor got his merchandising start behind the counter of some drug store; the average grocer served his apprenticeship, probably, as a grocer's delivery boy; the average department store executive is a man who has "grown up" in department store work. But the average retailer of electrical goods is a man who first met the thing called a volt when it smote him through the handles of a pair of wireman's pliers.

Very likely he began as a wireman's helper. For 4 or 5 yrs. he wore overalls every day and combed plaster out of his hair every night. Then he was graduated into the eminence of a wiring contractor, a station of life wherein he could hire other men to absorb stray shocks and wear overalls on their bodies and plaster in their hair. At about that time he "opened up" a store—just opened it up. Still he continued to devote most of his time and thought to his contracting business. The store? Well, it was open, wasn't it? And Minnie was running it, wasn't she? It was doing business, and profitably—so far as anybody knew.

"But that's just the trouble," said Mr. North, as he talked about the retailer and his problems. "The electrical dealer has had no training in merchandising. It doesn't interest him. He doesn't realize that in establishing a store he has projected himself into a new and entirely different vocation that calls for specialized study. He just doesn't know the things that he ought to know about merchandising. In fact, he doesn't know just what his store is doing. For instance, consider accounting. The percentage of failures

in business can be reduced if individual dealers and the heads of retail concerns in the electrical field can be convinced that a certain percentage of their gross income should be expended to give them daily facts and monthly statements about their business. Many failures—commercial failures, I mean—don't realize that they really are failures. They continue in business year after year, barely making a living and realizing no return on their investments. They would be better off working on salaries for successful concerns, with their capital deposited in savings banks at 4%.

"But the encouraging fact is that these retailers of electrical devices and materials are, all of them, bright, intelligent wideawake chaps. In the line of work in which they have grown up they have had to be alert. They *can learn* merchandising. They can learn it quickly. And when they have learned it, competition wants to keep out of their way!"

Establishment of School for Executives in All Branches.

A school for executives—not only executives of retail stores, but of jobbing, wholesale and manufacturing concerns—was the Electrical League's next educational venture. There are classes in store management, factory management, personnel work, accounting, finance, advertising and the other phases of executive work and executive requirement. In the meantime there is now in actual progress and has been for several months another Electrical League school. It is most emphatically a going concern. I visited the League's school for salesmen. Never anywhere have I seen so much downright enthusiasm and so much pure and unadulterated earnestness within the four walls of a classroom.

This school was started back in September of last year. Electrical dealers had reported a shortage of salesmen. There were no salesmen to be had, not even salesmen with the thinnest smattering of a training in the sale of electrical goods. Sheer necessity created the school. Then science and refinement of method came along to help necessity round out the job. If we're going to train salesmen, said the league, let's train 'em right. L. H. Reiss, ex-salesman, former sales manager and former lecturer on salesmanship, was engaged as instructor.

Twenty-three men constituted the first class. Of the 23, one was a district sales manager, five were appliance salesmen, two were wiring contract salesmen, one was a manufacturing salesman, four were jobber salesmen, two were managers of retail electrical stores and seven were new entrants into the electrical trade. The course, for which each student pays a tuition fee of $65, is just 1 mo. of working days long. Every working day of that month there is a class from 8 a. m. until noon.

Early in the course the student is introduced to the fundamentals of marketing—such things as credit, accounting, statistics, actual selling and advertising. Then comes personal analysis. The student salesman is taught enough of psychology to enable him to take his own thinking processes apart and see for himself what makes them run. He is given a method for "checking up" his own personality at regular intervals and bolstering up the weak spots. He is taught to think in a straight line, to sharpen his powers of perception and to make more retentive his memory. He is coached and drilled in thinking and talking on his feet before an audience. He turns his scrutiny upon the customer and is shown how to analyze him and his mental processes from his appearance. He learns how sales executives survey their fields, how they use statistics and charts and how they establish sales quotas. And, finally, he goes through four lessons that take him in detail into the sale itself, from the approach to the closing.

I asked the instructor, Mr. Reiss, about results. "Tell you what you do," he said. "You go over and talk to Mr. Watt. Yes Mr. Watt. He was in the first class—we called it the Pioneer Class. In fact, he's president of the Pioneer Club, into which all our graduates go. The club, you know, meets every week here at the league headquarters for discussions of sales problems."

I found Mr. Watt as the proprietor of an electrical appliance store in one of Cleveland's multitudinous arcades. His full name is K. M. Watt. I don't know what his first name is, but it could very appropriately be Kilo. I asked him what he thought of the school for salesmen. "Of course," he said, "I'm for it—strong. But perhaps you are interested in the specific thing that, of all the things I got out of the course, I value most highly. It was the study of personality—of my own personality and of the personality of the customer. We had a slogan, 'Keep the boss on the job.' The 'boss' was one of our own personal characteristics that we were taught to test out and keep up to standard; it was will and initiative. I use it every day."

There was an interruption. Mr. Watt was wanted out on "the floor" to deal with a customer who had asked for the proprietor. I trailed along to listen. The customer was a quiet sort of chap, middle-aged, a skilled laborer of some sort, I deduced. He wanted "to look," he said, at an electric washing machine. He was thoughtful, studiously thoughtful, and he asked leading questions about mechanism and materials. I did not time the sale, but the transaction was completed, I should say, in 12 min. The consideration was $180.

Back in the office again, Mr. Watt said: "Now did you notice that man—how he acted? When I looked at him I knew he would act just that way. I knew how I should talk to him. He was easier, a good deal easier, to sell than his type indicated. I worked faster—maybe because you were waiting—than I would otherwise have done. But I kept in the right track. You saw the result.

"And, by the way, if you see Mr. Reiss again I wish you would tell him that in the sale you just witnessed I used our classroom 'stuff.' Tell him that, although the customer was of the alkali-reflective type, I worked rapidly and sold him—probably because he had done his reflecting at home. Tell Mr. Reiss that—'alkali-reflective.' You may not know what it means, but he will know."

I delivered the message. But I don't know yet what "alkali-reflective" means.

EDITORIAL COMMENT

N. A. E. C. D. Convention

Of importance to all branches of the electrical industry is the 21st annual convention of the National Association of Electrical Contractors and Dealers at Buffalo, July 18-23. Preceding issues of ELECTRICAL REVIEW have outlined the program, and more details will be printed in the issue of July 9 regarding the unusual accomplishments and growing possibilities of this youngest but most "husky" member of the Family Electric. Vital issues are at stake and valuable results are promised from this anniversary convention of the Association in the city of its birth.

Chicago Hears Industry's Warning

Since the electrical industry received its first warning from ELECTRICAL REVIEW regarding an attempt made in Chicago to deal a blow to the industry and to its citizen-consumers of electricity through an ill-advised piece of local legislation, for the ostensible purpose of protecting users of electrical devices and materials, but in effect to reap an exorbitant revenue from the manufacturers, there is evidence that the ordinance will either fail of passage or will suffer a radical pruning of its harmful elements.

When the first draft of this ordinance came to the attention of ELECTRICAL REVIEW early in March, this publication sent a personal letter to manufacturers of appliances and materials, citing the gist of the proposed rules by which a levy of $5 annually would be made for the inspection and approval of each device and piece of material sold or used in the city of Chicago. The original ordinance was printed in full in the April 9 issue of ELECTRICAL REVIEW. In response to our letter and editorial attention the manufacturers took the matter up with their Chicago representatives and through them with the Electrical Committee of the Chicago Association of Commerce. The various organizations in the industry also made representations through the same source or direct to the commissioner of gas and electricity in Chicago. Further comment on the ordinance was printed in the April 30 issue of ELECTRICAL REVIEW.

This preliminary agitation caused the electrical department of the city to revise the proposed ordinance by apparently modifying the terms which applied to the fee demanded for examination and approval of the electrical devices and materials. Instead of the fee of $5 annually for each item of production, the figure was revised to make a preliminary charge of $1 for each group of a type of devices and material. No limit, however, was fixed as to the amount which could be charged the manufacturer for the work of testing and approval. This second draft also limited the number of clerks which an electrical contractor-dealer might employ under his license for doing business at one location within the city. For a fee of $50 the dealer would be permitted to employ up to five clerks and do business in one location. For each clerk over five, an additional charge of $5 was to be made.

Chicago's organization of electrical contractors and dealers is actively opposed to the ordinance or any ordinance that is adverse to the best interests of the electrical industry as a whole. Under date of May 17, J. W. Collins, secretary of the Electrical Contractors' Association of Chicago, sent the following official notification on the subject to Paul A. Westburg, chairman of the Electrical Subcommittee of the Chicago Association of Commerce:

> Confirming our verbal conversation of May 11, wish to say that our Association as a body and our directors in particular are on record as being opposed to any form of license which would place in the hands of municipalities the approval of electrical material and apparatus.
>
> We do not oppose this for the reason that the license would cost our members a separate fee, but we realize that if this license was made effective in Chicago, it would undoubtedly spread all over the United States and each municipality would have a separate standard of their own which would cause manufacturers to carry such a varied line of materials and apparatus that the progress and inventive genius of trade would be stifled. Legislation of this sort tends to retard the progress of standardization which we must agree is most necessary in the electrical industry. We feel that the trade today is compelled to stock too large a variety of materials, due entirely to lack of standardization.
>
> I wish also to say that we have done everything in our power to interest all the different branches of the industry in the city in stopping such legislation and, recognizing the good work that your committee is doing to this end, I am privileged by our officers to offer any assistance to your committee that would be of any value to you.
>
> Our Association attempts to approach every subject placed before it in the light of its effect on the entire industry and does not confine its activities to securing conditions for its own particular branch. I trust that you have the means at hand to correct the mistaken idea that our Association is anything but opposed to legislation of this character.

While the National Electric Light Association was in session in Chicago a few weeks ago, representatives of the industry appeared before the city council and presented an emphatic remonstrance against the ordinance. From that moment the ordinance appears to have lost favor with the city administration. At a general hearing held

June 22, the latest draft of the ordinance was taken up for discussion section by section. So many difficulties and conflicts were encountered that it was impossible to cover more than three sections before the time for the hearing was exhausted. The council committee recognized the fact that it would be practically impossible to come to a conclusion, allowing the various interested individuals and organizations to be heard, without conducting a number of additional hearings. Consequently an adjournment was agreed upon until next fall when the entire proposition will be gone into in full, so it was said.

Electrical Dealers and the Retail Congress

For the first time in history the electrical contractor-dealers of the Nation will have an opportunity to participate in a "National Congress of Retail Merchants" for the development of business building plans and ideas. Retail dealers from all over the country will assemble in Chicago during the first week of the Pageant of Progress, Aug. 1-6. On Aug. 4 and 5, the dates set aside for the merchandisers of the electrical fraternity, dealers in electrical appliances, lighting fixtures and wiring materials will meet in the Red Room of the Hotel La Salle, which has been reserved by ELECTRICAL REVIEW for that purpose.

The electrical fraternity will be represented at this great gathering of retailers as befits the important place it has recently acquired in the business activities of the country. Leading dealers from every section have signified their acceptance of the invitation to take active part in the interesting program prepared for their days of the Congress. There will be ample opportunity for discussion of leading vital topics which the electrical industry has initiated at its various conventions during the past year.

As the Pageant of Progress will be the biggest event in Chicago, if not in the whole country, this year, there will be many other features of educational value and interest for the visiting contractor-dealer in addition to the special meetings of their own on Aug. 4 and 5. No progressive dealer should miss this event.

Wiremen and Code Knowledge

In order to do his work properly every contractor and wireman should be familiar with the regulations which govern that work. Just as ignorance of the law is no excuse, so ignorance of the proper manner of doing his work is no excuse for the inefficient workman. Especially in electrical construction where defective work may result in hazards to life and property, should every worker be familiar with the recognized standards of installation.

The National Electrical Code is the general standard for electrical construction work in this country, and in many large cities this is supplemented by additional requirements which are considered necessary for acceptable installations in congested districts. In a few other places there are entire codes which have been drawn up independently, and in such places what is said here regarding the National Code would apply to such local codes. With the broadening of the personnel of the committee which conducts the biennial revision of the Code, there is less occasion for these independent local codes, and as a matter of fact the necessity for them is growing less each year.

Even where entire municipal codes are in existence, or where there are additional restrictions, the provisions of the National Code are usually enforced and every electrical contractor and wireman in whatever part of the country he may be located should be familiar with these provisions. Possession of a copy of the National Code is easily acquired since it is published complete in the *Electrical Blue Book*.

That all of those connected with electrical work are not familiar with these rules is evidenced by the frequency with which questions are sent to us upon points which are fully covered by the Code rules and which would never be asked by one who was familiar with them. Other indications are seen in the many instances where inspectors are compelled to order changes in wiring work. There is but one remedy for this condition and that is for every man connected with electrical installation to study the Code.

Watch the Overhead

The necessity in any business of making the proper allowance for overhead expense when determining the prices to be charged is a fundamental one, but unless this situation is properly understood and handled, the concern which is negligent is likely sooner or later to go to the wall. Deficiencies along this line have been common in the electrical contracting business and the various contractors' associations have been doing an important work in educating their members to the necessity of properly handling this element of the business.

It is that elastic and elusive item of overhead that has so frequently and persistently devoured the supposed margin of profit on a wiring job, that has broken the spirit and purse of many an electrical contractor and sent him back to the ranks of employes who prefer to let someone else figure the estimates rather than acquire the exact

information and the larger profits of independent operation.

There are plenty of successful contractors in the electrical field today who are only too glad to give accurate information as to methods of figuring overhead, because there is no profit in ignorant competition which is based on guesswork and is demoralizing to both the industry and the public. Secretaries or managers of local and state associations are eager to furnish this information and it may also be had from the National Association of Electrical Contractors and Dealers and from the Wiring Committee of the National Electric Light Association.

International Standardization

The secretary of the American Engineering Standards Committee, Dr. P. G. Agnew, has just returned from a short trip to Europe where he attended a conference in London of the secretaries of the national standardizing bodies. After the conference he visited France, Switzerland and Germany for a more detailed study of the standardization work in those countries. The conference, which was called by the secretary of the British Engineering Standards Association, C. le Maistre, had for its object an interchange of experience and the furtherance of co-operation between the various national bodies in their work of industrial and engineering standardization.

It is interesting that, notwithstanding great differences in the details of procedure, the same general method of work is followed in the different countries, namely, technical decisions concerning any specific piece of work are in the hands of a working committee which is so constituted as to be broadly representative from both the technical and the managerial points of view of the particular branch of the national industry concerned. This same general method is followed whether the work is of the nature of specifications, methods of test or dimensional standardization.

The secretaries will submit the suggestions of the conference to their respective organizations for approval. These have to do with the interchange of publications, a reciprocal arrangement for making foreign standards available to the industries of each country through their sale by the offices of the national bodies, the exchange of information as to the status of work in progress, and other methods of furthering co-operation between the national bodies.

It was the view of the conference that international co-operation in industrial standardization work should proceed along such informal lines, being based primarily upon the interchange of information on active subjects of mutual interest rather than by any attempt at the present time to form a general international standardizing body; that in cases in which formal organization should be found necessary the organization should preferably be by subject or industry, somewhat along the lines of the International Electrotechnical Commission; but that in all cases efforts should first be made to secure results by less formal methods; and to this end it would often be desirable that, in a given subject, the office of one of the national bodies most interested should by informal agreement perform such secretarial functions as would further international agreement in the particular subject.

Arrangements are being made for close co-operation between the national standardizing bodies and the International Chamber of Commerce, which will give special consideration to the subject of standardization at its coming convention in London, and has organized a committee to develop interest in the subject on the part of industrial and commercial interests, and for the diffusion of information on standardization. It is the policy of the International Chamber of Commerce to further the standardization movement by such means, considering only the more general aspects of the problem and the policies to be followed, leaving the details of industrial standardization to the national bodies who will co-operate directly with the national organizations of the International Chamber of Commerce in their respective countries.

It was felt by all concerned that the conference was a very successful one and that it constituted an important forward step in establishing a closer relationship and understanding between the various national bodies. The countries represented were Belgium, Canada, Great Britain, Holland, Norway, Switzerland and the United States.

Economizer Maintenance

The economizer is finding rapid application in power plants, since the fuel economy accompanying its use is coming to be better appreciated. Central stations, where the load-factor is relatively high, where higher steam pressures are in vogue and high rates of steam making are employed and special attention is being given to economical use of station auxiliaries, especially are taking to the economizer.

In some quarters there seems to be a misapprehension as to the cost of economizer maintenance. As a matter of fact the cost of maintaining economizers has been found to be remarkably low. One of the largest economizer manufacturers recently made the statement that covering $1,000,000 worth of economizers the average cost of maintenance for the first 10 yrs. was believed to be well under 0.5% of the investment.

THE WEEK'S NEWS

Reports of Important Meetings, Developments and Other Happenings of the Electrical Industry and Its Allied Interests

NEW N. E. L. A. OFFICERS CALLED TO PLAN ACTIVITIES.

Calls have been sent to all officers-elect and members-elect of the National Executive Committee and the several Sections of the National Electric Light Association to assemble at headquarters in New York City next week for the purpose of planning the activities and programs of the Association for the coming administrative year.

Members-elect of the Accounting Section are the first to be called. They will meet at the National headquarters June 28, at which time there will also be a joint meeting of committees of the National Electric Light Association and the American Gas Association on "Uniform Classification of Accounts."

National officers-elect and members-elect of the National Executive Committee will go into conference at headquarters June 29. On June 30 the members-elect of the Technical Section, the Executive Committee and Public Relations Section will meet at headquarters and formulate plans and policies for the ensuing year.

The new Commercial Section Executive Committee will meet on Association Island July 22-23.

NORTHWEST GEOGRAPHIC DIVISION CONVENTION REPORT.

Program of Central Station Men at Multnomah Hotel, Portland, Ore., Arouses Enthusiasm and Demonstrates Great Progress.

By W. A. Scott.

The Northwest Electric Light and Power Association, which constitutes a geographic section of the National Electric Light Association, held its 14th annual convention at Multnomah hotel, Portland, Ore., June 15-17. The electric power and light companies of Oregon, Washington, Utah, Idaho and Montana were represented by officials and heads of departments, including members of technical staffs.

Effectiveness of the Association as a well organized working force was evidenced by the team work of committees, both general and special. The Public Policy Committee of each of the four states was represented by active members. The same may be said of the executive committees of the several sections, comprising those of Accounting, Commercial, Technical and Public Relations, with numerous subcommittees. The importance attached to the subject of Public Relations was indicated by the work of a general executive committee and that of a special committee from each of the four states dealing with relations with other utilities, regulation policies, relations with employes and other subjects. The reports submitted by the Technical Section, through its executive and subcommittees, were the result of careful research and intelligent work.

Franklin T. Griffith, president of the Association, called the convention to order, and, after a speech of welcome by the mayor of Portland, delivered an address, in which he dealt with the problems that seriously concern the public utility companies, not only of the Northwest, but of the entire country. Mr. Griffith, as president of the Portland Railway, Light & Power Co., spoke with intimate knowledge of the duties, responsibilities and problems that the utilities must meet. He took the position that the public utilities and private industries of a community are interdependent.

Relative to the matter of financing a public utility, to enable it to provide additional facilities to meet increasing demands for electric service, Mr. Griffith in his address made the following statement:

> In most cases the financial structures of utilities are made up of two classes of securities: (a) Bonds secured by mortgage on the property, and (b) stocks. As the hazard of the investment is less in the case of bonds, the bond purchaser should be satisfied with a lower rate of return than the purchaser of stock, but in any event the bond purchaser should receive on his investment a rate of interest fairly comparable to that which he may earn upon an equally well secured investment in other enterprises.
>
> As the stockholder accords a preference both as to assets and earnings to the bondholder, and in the case of disaster would stand a greater hazard of losing his investment than would the bondholder, the stockholder should have the right to earn a larger rate of dividend than the interest rate on bonds, and it would seem logical that this right to earn a larger rate of return should be offered to and accepted by the people of the communities directly served. Of late years a great deal of progress has been made in the matter of local financing of utilities through the sale of stock.
>
> The investor living in remote sections of the country naturally prefers to invest in bonds, but the citizen of the local community, being in close touch with his utility and in a position to directly aid and influence its management and its success, in most cases would prefer to purchase stock with its prospect of a higher rate of return than he would receive on bonds of the same utility. There have been some striking illustrations of successful operation of this method of finance. One Pacific Coast utility has, during the last 5 yrs., sold to the citizens of the communities served by it a total of $26,000,000 of stock, all of which has been invested in the expansion of the property devoted to public service with results mutually advantageous to the corporation, its customers and the purchasers of its stock.
>
> In all cases of which I have knowledge where this method of local financing has been carried on, it has resulted not only in aiding the utility in financing the expansion of its facilities, but has materially assisted in establishing and maintaining that spirit of confidence and good will so essential to true co-operation. The adoption of this method of finance generally, I am confident, would be of incalculable benefit to our industry and of hardly less value to the people of the communities we serve.
>
> There is, however, one serious handicap under which all utilities suffer in financing the expansion of their facilities to meet the demands made upon them. The utilities being in the market constantly for enormous sums of money must compete with all other forms of

investment. They must offer not only unquestioned security, but also a rate of return in interest or dividends comparable with what the investor can secure in other forms of investment.

The most serious competitor for investment monies is the tax-free bond issue by governmental agencies. Prior to the great war this competition was sufficient to keep the rates on utility and industrial securities materially higher than the rates paid upon bonds issued by governmental agencies, but utilities were at that time able to secure investments at fairly reasonable rates.

Imposition of the income tax, growing directly out of the war, has greatly increased the handicap under which utilities suffer in securing investment funds in competition with tax-free securities, and has had the effect of steadily forcing up the rate of interest utilities and other industries must pay for money in order to make the return fairly comparable with the return afforded an investor in tax-free securities.

There are billions of dollars of tax-free securities held by investors in the United States, and by reason of the fact that municipal, county and state securities are exempt from all taxation, and therefore floatable at comparatively low rates of interest, a steadily increasing volume of such securities is being issued under the mistaken belief that the public generally is benefited by the tax-free provision.

Cost of money employed in any enterprise, public utility or private, is a part of the cost of production and must necessarily figure in the rates or prices charged for the service or goods produced, and the logical effect of the tax exemption of government securities is that while the public, collectively, may save cost by reason of the lower rate of interest paid on the state, city or county bond, it must eventually pay the higher cost of all service and goods produced by the more expensive money.

Optimistic Reports of the Various Officers and Committees.

The president's address was followed by the reports of Stacy Hamilton, secretary-treasurer, and of Geo. L. Myers, chairman of the membership committee, both of which indicated a satisfactory condition of the association's affairs. The latter showed a substantial increase in members.

The Committee on Resolutions, appointed by the president, comprised the following: Guy W. Talbot, president, Pacific Power & Light Co., Portland, chairman; R. W. Clark, Puget Sound Power & Light Co., Seattle; J. B. Fisken, consulting engineer, Washington Water Power Co., Spokane; R. M. Boykin, manager, North Coast Power Co., Portland; R. M. Jennings, manager, Douglas County Light & Water Co., Roseburg, Ore.

Members met for luncheon at Hotel Benson, during which there were brief addresses by M. H. Aylesworth, executive manager, National Electric Light Association, and Robert Sibley of San Francisco. On reassembling at the convention hall the president introduced E. V. Kuykendall, director of Department of Public Works of the state of Washington. The latter, speaking as a member of a state regulatory body, said there was need for disseminating exact information on the fundamentals of state and federal regulation. He thought most people were disposed to be fair when they know all the facts about the utilities. Most of the ill-will, he thought, was traceable to agitators talking for political effect, and by undiplomatic, discourteous employes.

Mr. Aylesworth, in an address at the afternoon session, talked forcefully and effectively on the work contemplated by the National Electric Light Association, referring especially to a plan of continuous publicity proposed whereby the simple, truthful story of electricity may be delivered to men and women who are present and prospective users of electrical energy. The manufacturers, jobbers and utility companies are to share in this educational work. He referred in a complimentary way to the influence of Northwest electric power men in securing the adoption of workable regulations by the Federal Water Power Commission.

Accounting Section Committee Reports and Discussions.

J. S. Simpson, chairman of the governing committee of this section, presented the committee's report which was available in printed form. A special paper relating to this subject was read by Geo. F. Nevins, treasurer of the Pacific Power & Light Co.

In discussing this subject, Geo. E. Quinan, chief engineer of the Puget Sound Power & Light Co., suggested greater co-ordination of all departments. He was followed by W. R. Putnam, manager of Idaho Power Co., and Geo. G. Thomas of Utah Power & Light Co. R. W. Clark of Puget Sound Power & Light Co. thought there was too little co-operation among the several departments of a company, and as a result the man who is well informed in his own department may know little about any of the others. Other remarks were made by E. G. Robinson, manager of Molalla Electric Co., Molalla, Ore.

Abstract of Proceedings of Second Session.

R. W. Clark, Seattle, chairman of the governing committee of the Commercial Section, submitted his general report, in which the development of the commercial viewpoint of the members was noted as an evidence of progress. Under this section there was submitted the elaborate report of J. F. Farquhar, of Washington Water Power Co., chairman of the Committee on Commercial Service Relations with Customers. The subject was dealt with from the standpoint of the service department.

W. R. Putnam, chairman of the Committee on Compensation of Salesmen, read the committee's report, which he said was prepared by J. F. Orr, Idaho Power Co. The report took up the salesman's relations to the utility company and the public, and dealt with the subjects of salary, commission and bonus.

As a part of the Commercial Section, the report of the Power Sales Bureau was read by J. V. Strange, Pacific Power & Light Co., chairman; and in similar manner, A. C. McMicken, chairman, reported for the Advertising and Publicity Service Bureau; J. S. Groo, Portland, reported for the Electric Vehicle Bureau, and F. H. Murphy, Portland, read the report of the Educational Committee, in which the employe and the public were considered.

Commercial Section papers were discussed by W. R. Putnam, Boise, Ida.; Franklin T. Griffith and A. C. McMicken, Portland, Ore.; Herbert M. Flagg, Olympia, Wash.; H. D. Walther, Medford, Ore.; L. A. Lewis, Spokane, Wash.; Geo. C. Miles, Westinghouse Electric & Manufacturing Co.; G. A. Boring, Pacific States Electric Co.; J. F. Strange and F. H. Murphy, Portland; W. E. Coman and L. A. Lewis, Spokane, and Geo. E. Quinan and R. W. Clark, Seattle. In all discussion there was general agreement with the substance of the committee reports, the remarks deal-

ing mostly with ways of applying the principles and conclusions enunciated.

Stephen I. Miller, secretary-manager of Northwest Electric Service League, in a spirited address, set forth the purposes of the League, and outlined some of the basic principles which he thought should be kept in mind. While the League is ready to function, as the Association had planned, Mr. Miller counseled patience, and reminded the members that its work would require continuous effort through years of time to attain in full the results desired.

REPORT OF PUBLIC RELATIONS SECTION ACTIVITIES.

Public relations constituted the controlling thought of the convention. Plans for improving relations with the public were outlined in a report by the Executive Committee, which is charged with the consideration of such relations. The committee was composed of W. H. McGrath, Puget Sound Power & Light Co.; O. B. Coldwell, Portland Railway, Light & Power Co.; W. E. Coman, Washington Water Power Co.; S. R. Inch, Utah Power & Light Co.; R. M. Boykin, North Coast Power Co.; R. B. King, Idaho Power Co., and John A. Laing, Pacific Power & Light Co. Supplementary to the principal report there was submitted a report on Relations with Investment Bankers, and a report by the Committee on Publicity.

Those reports called forth some interesting discussion. It is considered that the work of the Electric Service League may have an important bearing on the objects aimed at by the Public Relations Committee.

An able paper by Geo. L. Myers, Pacific Power & Light Co., on "Winning Public Support and Confidence in the Public Service Industry," was a valuable contribution. In it advanced ideas and suggestions on Public Relations were clearly set forth.

The evening session of the second day was given over to an address by Robert Sibley, San Francisco, on "Western Industrial Development," and an address by C. E. Driver, Seattle, on "Public Utility Securities."

The first feature of the closing session was a paper by L. T. Merwin, manager, Northwestern Electric Co., Portland, on "Some Essentials of Power Development." Mr. Merwin having been called away, his paper was read by R. M. Boykin. Then followed the committee reports of the Technical Section, by committee chairmen, as follows: Report of Governing Committee, by G. E. Quinan, chairman; Hydraulic Power, by J. B. Fisken; Overhead Systems, by R. M. Boykin; Underground Construction and Electrolysis, by H. R. Wakeman; Heat Energy and Prime Movers, by L. T. Merwin; Meters, by H. R. Wakeman; Safety Rules, by H. H. Schoolfield; Inductive Interference, by G. E. Quinan; Electrical Apparatus, by F. D. Nims. All reports were carefully prepared and were submitted in pamphlet form.

At an executive session various amendments to the constitution were adopted, one of which provided for changing the name of the Association to Northwest Geographic Division of the National Electric Light Association.

Election of officers resulted as follows: President, W. R. Putnam, of Idaho Power Co., Boise, Ida.; vice-presidents—for Oregon, Geo. L. Myers, Portland; Washington, J. M. Kinkaid, Montesano; Idaho, I. E. Rockwell, Hailey; Utah, P. M. Parry, Salt Lake City.

The following three members at large of the Executive Committee were elected: A. M. Brewer, Mountain States Power Co., Albany, Ore.; L. A. McArthur, Pacific Power & Light Co., Portland, Ore., and L. B. Faulkner, Olympia Power & Light Co., Olympia, Wash.

GOODWIN AT GET-TOGETHER FEAST IN BUFFALO.

W. L. Goodwin, business manager of The Society for Electrical Development, was the guest of honor at a dinner given by the H. I. Sackett Electric Co. at the Lafayette hotel, Buffalo, on the evening of June 13. Mr. Goodwin discussed in detail the economic problems of the industry with special emphasis on the necessity for an understanding of the proper functions of jobber and dealer in their respective positions in the channel of distribution from manufacturer to consumer.

Commenting on the talks given by manufacturers' representatives at the dinner, Mr. Goodwin stated that he was particularly impressed with the fact that of the six manufacturers' representatives who spoke not one talked on his particular line. The keynote of all of the talks was policy—not merchandise. Other speakers at the Sackett dinner were Henry J. Popkin, of Shapiro & Aronson; C. J. Cooper, Wise-McClung Mfg. Co.; W. O. Roach, Chicago Fuse Mfg. Co.; H. E. Murphy, of The Luminous Unit Co.; R. P. Ingalls, Simplex Electric Heating Co., and A. McLachlan, Square D Co.

WATER POWER LEAGUE TO FAVOR PRIVATE DEVELOPMENT.

Manufacturers interested in the subject of water power from the standpoint of the consumer assembled in New York City, June 21, for a conference called by the Water Power League of America to discuss the questions of power, power shortage, cost of fuel and amendments to be asked to the Federal Power Act. The League hopes to induce private capital to invest in the enterprises of water-power development to relieve power shortage and reduce the cost of power to the consumer.

The League assails the workings of the Federal Power Act as "detrimental to water-power development" and asserts that "the act has made it practically impossible for private enterprises to engage in these undertakings." The League also asserts that the Federal Act has taken from the several states all their rights to intrastate streams within their borders and places them in charge of the Federal Power Commission, which is composed of the secretary of war as chairman, the secretary of the interior and the secretary of agriculture. Also, it is asserted that the Act takes from Congress the powers it has exercised and also takes from the war department the authority vested in it by the Constitution and relegates these powers to the Commission.

Officials of the League assert there are on file at Washington today more than 200 applications

for permits and licenses to develop water powers. The total horsepower of these projects is estimated at more than 20,000,000, and if they were carried to completion it would require several billion dollars to finance them. League officials say all these projects have been halted by rules and regulations promulgated by the Power Commission, which passed out of existence March 4 with the change of administration. The League declares: "American financiers refuse to consider the investment of hundreds of millions of dollars in projects made uncertain by the vagaries of a body of men subject to changes in American politics every 4 yrs."

NEW OFFICERS OF ILLUMINATING ENGINEERING SOCIETY.

The following is a list of officers of the Illuminating Engineering Society for the fiscal year commencing Oct. 1, 1921:

Officers of the Council—President, Dr. George S. Crampton; junior past presidents, Samuel E. Doane and George H. Harries; vice-presidents, F. M. Feiker, James J. Kirk and H. F. Wallace; secretary, Clarence L. Law; treasurer, L. B. Marks; directors, F. C. Caldwell, A. D. Curtis, P. S. Millar, Francis E. Cady, D. McFarlan Moore, Robert B. Ely, Adolph Hertz, Walton Forstall and Frank S. Price.

SECTION OFFICERS.

New York Section—Chairman, H. V. Bozell; secretary, S. W. Van Rensselaer; managers, Herman Plaut, S. G. Hibben, E. A. Mills, Davis H. Tuck and John Boyle.

New England Section—Chairman, W. J. Drisko; secretary, J. T. Kerens; managers, F. A. Gallagher, Jr., John Nash Ives, Edwin S. Parker and E. E. Stevens.

Philadelphia Section—Chairman, H. B. Andersen; secretary, H. Calvert; managers, J. R. Henry, Howard Lyon, W. L. Nodell, Emile G. Perrot and G. Bertram Regar.

Chicago Section—Chairman, F. F. Fowle; secretary, A. L. Arenberg; managers, Albert Scheible, F. A. Rogers, J. J. Kirk, Lee Farmer and J. H. Allen.

FIXTURE MANUFACTURERS' MEETING POSTPONED.

Owing to unforeseen contingencies which have lately developed, the National Council of Lighting Fixture Manufacturers has deemed it advisable to indefinitely postpone the midsummer meeting which was to have been held at West Baden, Ind., July 6-8. The foregoing announcement was sent out by Secretary Chas. H. Hofrichter, 231 Gordon Square building, Cleveland, under date of June 21.

VENTILATION SHOW HELD IN NEW YORK CITY.

Twenty-five of the leading manufacturers of ventilating equipment have taken space at the Ventilation Show which opened June 20 at the Irving Place showroom of the New York Edison Co., New York City. Practically every type of air conditioning apparatus was displayed and all of the equipment was in operation. Fans of various types made up a large part of the display and one of them, 12 ft. diam., is the largest ever operated in New York. This huge fan is intended for theater or restaurant use. It is equipped with 30 blades, weighs 2360 lbs. without the motor, and is driven at the rate of 125 r.p.m. by a 15-hp. motor, displacing 150,000 cu. ft. of air per min. In contrast with this creator of a miniature typhoon is an 8-in. fan for home use.

Fans for removing acid fumes in laboratories, industrial dust and dirt in factories, stale air in offices, gasoline fumes in garages and cooking odors in the home were also shown. Air conditioning machines for maintaining the right percentage of humidity were in operation.

COMMISSION MAY REQUIRE DEPRECIATION RESERVE FUND.

The Oklahoma Corporation Commission conducted a hearing June 21 on a proposed order which would require all utilities and public service corporations in the state to set aside a depreciation reserve fund. It is proposed that no public-utility company shall be permitted to pay out dividends in excess of 6% of the record value of its property "used and useful in rendering service" until after the full amount of allowed depreciation shall be paid into the depreciation reserve fund of such company.

The proposed order requires that this depreciation fund be kept intact, but permits any utility to borrow, for a period of not to exceed 3 yrs., not more than 60% of this fund to cover the cost of any new construction, extensions or additions to the property. The company must pay at least 5% interest on this amount until returned to the depreciation fund. The proposed order will not be effective unless given final approval by the Commission following the hearing, and is subject to any modifications the Commission may see fit to make following the hearing.

COMING CONVENTIONS.

Associated Manufacturers of Electrical Supplies. Summer meeting, Eastern Point, New London, Conn., June 27-July 2. General secretary, Charles E. Dustin, 30 East 42d street, New York City.

Wisconsin State Association of Electrical Contractors and Dealers. Summer outing and business meeting, Waupaca, Wis., July 9-11. Secretary, H. M. Northrup, 23 Erie street, Milwaukee.

Ohio Electric Light Association. Annual convention, Cedar Point, O., July 12-15. Headquarters, Breaker's Hotel. Secretary, D. L. Gaskill, Greenville, O.

National Association of Electrical Contractors and Dealers. Anniversary convention, Buffalo, N. Y., July 18-23. Headquarters, Lafayette Hotel. Secretary, W. H. Morton, 110 West 40th street, New York City.

Pennsylvania State Association of Electrical Contractors and Dealers. Semi-annual meeting, Buffalo, N. Y., July 19. Headquarters, Lafayette Hotel. Secretary, M. G. Sellers, 1518 Sansom street, Philadelphia.

New England Geographic Division of the National Electric Light Association. Annual convention, New London, Conn., Sept. 6-9. Headquarters, Hotel Griswold. Secretary, Miss O. A. Bursiel, 149 Tremont street, Boston.

Association of Iron and Steel Electrical Engineers. Fifteenth annual convention, Chicago, Sept. 19-24. Headquarters, Hotel La Salle. Secretary, John F. Kelly, Empire building, Pittsburgh.

Illuminating Engineering Society. Annual convention, Rochester, N. Y., Sept. 26-30. General secretary, Clarence L. Law, 29 West 39th street, New York City.

New York Electrical Show, 71st Regiment Armory, Park avenue and 34th street, New York City, Sept. 28-Oct. 8. General manager, George F. Parker, 124 West 42d street, New York City.

APPLIANCES and DEVELOPMENTS

New, Improved or Interesting Electrical and Mechanical Apparatus and Devices, and Applications of Equipment and Methods in Practice

Electric Range With Long-Life Heating Elements.

The "Universal" electric range, manufactured by Landers, Frary & Clark, New Britain, Conn., has been designed with the idea in mind of incorporating in a single stove the various selling features usually found only in a wide variety of numbers and types, which means curtailed wareroom and selling expense, according to the maker. The "Universal" range is strong, attractive and requires little space. By the comparative efficiency, economy and dependability of heating units, values of electric ranges are gaged, states the manufacturer, and the "Universal" is claimed to embody these features. The merits of the "Universal" electric range are thus enumerated by the company:

"Universal" Electric Range.

It is of rigid construction and unusually compact and has an elevated oven of ample size, together with four durable, quick heating, inclosed hot plates placed at most convenient height. The height over all is 61 ins.; height of shelf 47 ins.; height of cooking surface only 30 ins.; size of oven 14 by 14 by 19 ins., and floor space required 27 by 29 ins. A turn of the switch and the "Universal" range is ready for use. Each element is equipped with the latest type of 3-heat switch, insuring instant control of heat at all times. The switches are conveniently placed so that one can tell at a glance whether the current is "off" or "on." The degree of heat, high, medium, or low, is clearly indicated. The fuses are easily accessible. The elevated oven is located at the most convenient height. The oven door is equipped with a large, cool handle, and the ventilating control is simple.

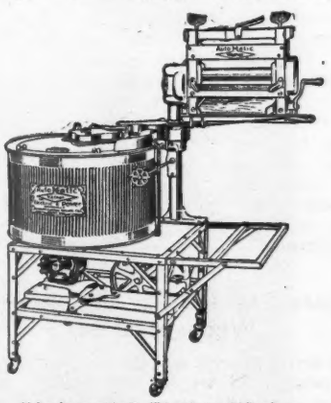
In the matter of efficiency of the "Universal" electric range it is stated that the inclosed type of hot plates heats quickly, yet, when the current is turned off, it retains cooking heat for long periods of time. The heat is concentrated where most needed. The oven is highly insulated and very economical—heats quickly and maintains a constant uniform temperature. The hot plates are constructed with overlapping rims—a special feature preventing spilled grease or other liquids from running under hot plates. No dirt, soot or disagreeable odors are created by the use of the electric range. The body and frame is entirely free of objectional screw heads so difficult to clean. The oven is correctly ventilated and the entire oven equipment can be quickly removed for cleaning.

The "Universal" electric range has a rigidly constructed frame and body with long-life heating elements and rust-resisting aluminized steel oven lining. Any part of the range may be easily replaced, if necessary, without the aid of a mechanic. The inclosed type, quick-heating hot plates eliminate danger of open flame or element, and all electrical connections are thoroughly insulated.

New Dolly Type Copper Tub Electric Washer.

The Automatic Electric Washer Co., Inc., Newton, Ia., has recently placed on the market a new dolly type of washer with copper tub and cast aluminum lid, the main features of which are thus set forth by the manufacturer:

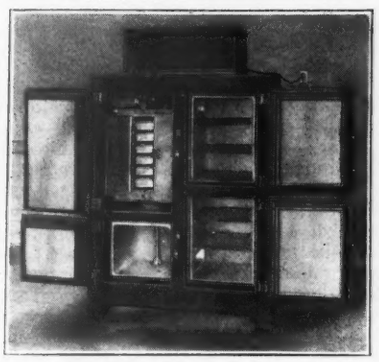
It has individual controls for washer and wringer and a safety release on the wringer. It is equipped with self-locking folding bench for holding extra tub. The "Automatic" improved dolly is of solid sycamore boiled in oil and has galvanized sliding dolly post. The pins are smooth and securely fastened in. The wringer has a hard maple frame and is equipped with 12-in. rolls; extra long coil spring; waterproof ball bearings with galvanized races, is instantly reversible and has the quick release. Every gear is completely inclosed and all moving parts are out of the way. The oil-cup method of lubricating the bearings is employed. The motor with which the washer is equipped is fully protected from water. The washer has a standard 6-sheet capacity and with bench extended requires a floor space of 23 by 44 ins., and with bench folded down, occupies a space of 23 by 30 ins.



"Automatic" Electric Washer.

A Complete Household Electric Refrigerator.

The domestic motor-driven refrigerator or ice box, energized by central station service, is becoming more extensively used in households each year because of its convenience and the assurance of the automatic maintenance of a proper food preserving temperature inside the compartments.



Interior View of Williams-Simplex Electric Refrigerator.

The Williams-Simplex electric refrigerator, made by the Simplex Refrigerating Corp., Sperry building, Brooklyn, N. Y., is specially designed and constructed to establish and maintain temperature and atmospheric conditions best suited for the preservation of food. The refrigerator walls are heavily insulated against the passage of heat and the linings are moisture and germ proof. It is regularly equipped for operation on either 110 volts direct current, or 110 or 220 volts, single-phase alternating current.

Ethyl chloride—a stable natural gas which condenses at the lowest pressure (averaging about 22 lbs. per sq. in.) of any commercially applicable refrigerant—is the refrigerant employed. It is harmless and inoffensive and the mechanism can be opened on the owner's premises without discomfort. The interior of the compressor is lubricated with glycerine, which, having a greater specific gravity than ethyl chloride and no affinity for it, eliminates the serious problem of separation.

The compressor is a rotary, valveless type, directly connected to the motor shaft without the employment of intermediary gearing or belting, and has a volumetric efficiency ranging from 82 to 85%. There is no stuffing box since the shaft seal is made absolutely tight without adjustment and the compressor is mounted integrally with and supported by the motor, insuring perfect alignment at all times.

The compressor and condenser are cooled entirely by the current of air circulated by a Sirocco type of blower mounted between the motor and compressor. The air is first drawn through the condenser chamber, which contains a continuous coil of copper tubing into which the refrigerant vapor is compressed, taking up the latent heat of vaporization, then it passes over the heat radiating fins of the compressor, taking up the heat of compression and thence into the blower from which it discharges through a flue extending through the top of the machine cover. Air is also simultaneously drawn from the opposite end, through and around the motor and discharged from the fan. Cooling by air instead of by water as commonly done, has proven quite satisfactory and the cost of water and drain connections and water consumption is excluded by this substitution.

Refrigerator Showing Ice Freezing Trays With Cubing Grids.

The expansion or cooling coils are filled with liquid refrigerant by the so-called flooded system. These coils connect into a vertical header from the top of which the vaporized refrigerant only is drawn and this vapor after being liquefied in the condenser is discharged into a chamber fitted with a float valve which permits it to feed back into the expansion coils at the same rate at which it is being condensed. This gives the radiating surfaces of the cooling coils a much higher heat transmitting capacity when full of liquid.

In addition the expansion pressure is automatically varied to maintain a constant balance between the compressor capacity and the radiating surfaces as the temperature changes. This provides maximum efficiency operating conditions throughout any range of temperature and does not necessitate a fixed lowest temperature.

The machine is controlled by means of a thermostat arranged to operate responsive to the temperature of the brine surrounding the expansion coils in the brine tank. The switching apparatus and its actuating motor are located on the machine base while the bulb of the instrument only is in the tank and protected from the action of the brine by being inclosed in a casing filled with a neutral nonfreezing liquid. Since the maximum temperature change occurs in the brine, this location of the thermostat bulb insures a sufficient range being obtained to positively operate the motor switch without any appreciable variation of the food chamber temperatures.

The switch has no delicate contacting devices or relays and is specially designed to eliminate "dead centres" and secure positive and quick action. In addition a safety switch operated directly by the pressure on the refrigerant, is provided and set at a predetermined safe limit. When this limit is reached, regardless of the cause, the switch will open and stop the motor.

All parts of the equipment, excepting the refrigerator itself and motor windings insulation, are of metal and the construction is in accordance with the requirements of the National Electrical Code, and the code of rules and regulations prepared by the American Society of Refrigerating Engineers and concurred in by the New York Fire Insurance Exchange, New York Board of Fire Underwriters and a number of other organizations having authority in these matters.

This machine has a capacity when operating at 15 deg. F. of about 150 lbs. of ice equivalent per 24 hrs. The power consumption, including motor losses, is from 190 to 300 watts. There is also a freezing chamber with a removable ice-freezing tray in cubing grid form, in which ice, ice cream or other frozen desserts may be prepared.

The Williams-Simplex electrical refrigerator is sold only as a complete unit and in two sizes, 44 ins. wide, 25 ins. deep and 60 ins. high and 48 ins. wide, with the same depth and height. To maintain these two refrigerators at suitable temperature, the machine would operate from 7 to 8 hrs. daily for the 44 in. box and from 9 to 10 hrs. daily for the other.

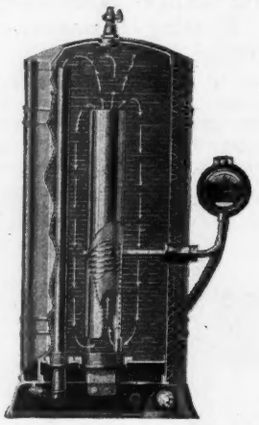
Booklet Outlines Two Plans of Successful Selling.

The Diamond Electric Specialties Corp., 101 South Orange avenue, Newark, N. J., has recently issued a 24-page booklet bearing the title "Two Plans for Increasing Sales." The company states that "increased sales volume is the immediate problem of dealers everywhere. This booklet lays out two distinct plans of successful selling, taking the reader step by step through every phase of their successful operation. These plans do not confine themselves to the two products we manufacture but combine the selling of all electrical household appliances."

Improved Models of Electric Water Heaters.

Two improved models of the "Sepco" automatic electric water heater, both rated at 3-gals. capacity, have been put into production by the Automatic Electric Heater Co. of Warren, Pa. These heaters are designed for use in offices, stores, rest rooms, lavatories, doctors' and dentists' offices, barber shops, bungalows, soda grills and wherever only a moderate quantity of hot water is needed. Similar heaters of 8, 20 and 40-gals. capacity have completed their field tests to the satisfaction of the manufacturer and will be placed upon the market as rapidly as possible. The full line of "Sepco" products will doubless be available by fall.

The new "Sepco" heaters at present offered and illustrated herewith are 24 ins. high, 14 ins. diam. and weigh 60 lbs.



Sectional View of "Sepco" Water Heater.

boxed. They are identical in all particulars excepting the heating elements; the model designated as D-360 having a 600-watt unit which may be attached to suitable outlet, while the D-310 contains a heating element of 1000 watts and is attachable to outlets provided for that capacity.

The 600-watt size requires 1 hr. to heat the original 3-gal. tank full of water from 60 to 140 deg. F. This will give 5 gals. of water at 95-110 deg. F. It is stated that the cost of this original heating is $0.03, with current at $0.05 per kw-hr. The cost of maintaining the temperature constantly at 140 deg. against loss by radiation amounts to but 5 mills per hr., while water drawn off intermittently and used at 100 deg. F. costs but 6 mills per gal. The other "Sepco" heater of this type, D-310, having a 1000-watt element, heats the original tank of water in but 35 min. and costs slightly less both for maintenance of heat against radiation and for heating the water used.

Outside View of 3-gal. "Sepco" Water Heater.

The high efficiency of "Sepco" water heaters is due to two features, it is claimed: An improved type of heating unit which permits the water in the

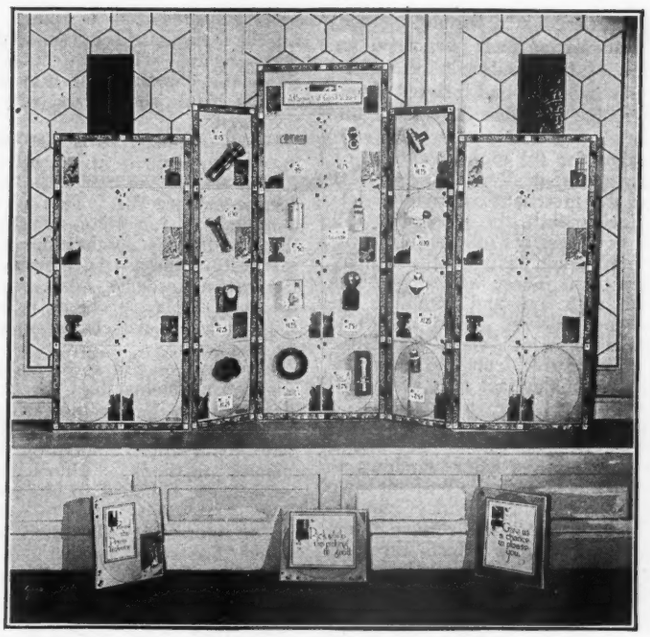
tank to circulate freely and thus to maintain an even temperature from top to bottom; and the very simple but effective "hot water seal" which minimizes radiation losses via the outlet pipe. The "Sepco" temperature control operates without relays or contactors; its simplicity and positive action will possibly appeal to those familiar with other methods of control.

A Practical Window Display Service.

Do you know that by a thorough study in the relative importance of the five senses—sight, sound, smell, touch and taste—it was found that 87% will buy by the attraction of sight? Do you know that Chas. A. Stevens & Bros., a large department store in Chicago, and other stores of a similar character secure an income of $150,000 per year and more from their windows, and that each department in the store is charged for the space according to the time, period and location of the individual display? Do you know that a New York store sold $300 worth of two-for-a-quarter article (for which there had never been a call) in 1 week while a window display featuring the product was run? Do you know that the United Cigar Stores have formed a subsidiary company for controlling their window space, incorporating it for $300,000, and that they keep a crew of men busy all the time dressing windows?

As the result of an exhaustive research, first in gathering data of the above character, and second through a questionnaire sent to independent owners of retail stores, the following window and interior display service was originated and designed to help solve the many display problems of the progressive retail merchant. Experienced display men know that permanent backgrounds continuously used are not the most desirable for a showing of merchandise. There are times when the permanent background on account of its permanent color scheme offers poor opportunities for a good display of merchandise, and again, goods continuously shown over the same background and setting leave the impression of sameness to the passing public, which discourages a frequent viewing of the different displays and soon places the attention value of the window in a rut.

This is why big stores continuously change the general appearance of their trims and thereby hold continued interest in their merchandise exhibits. This is done by temporary backgrounds or screens and that is where this service will prove its merit without elaborate expenditure in time and cash. The subscriber to the service is first supplied with 11 interchangeable display boards for use in windows and in showcases, on counters, tables and ledges. These display boards are especially built for this purpose and are of a pulp material, so that they may be readily pierced in attaching poster panels and merchandise to them.

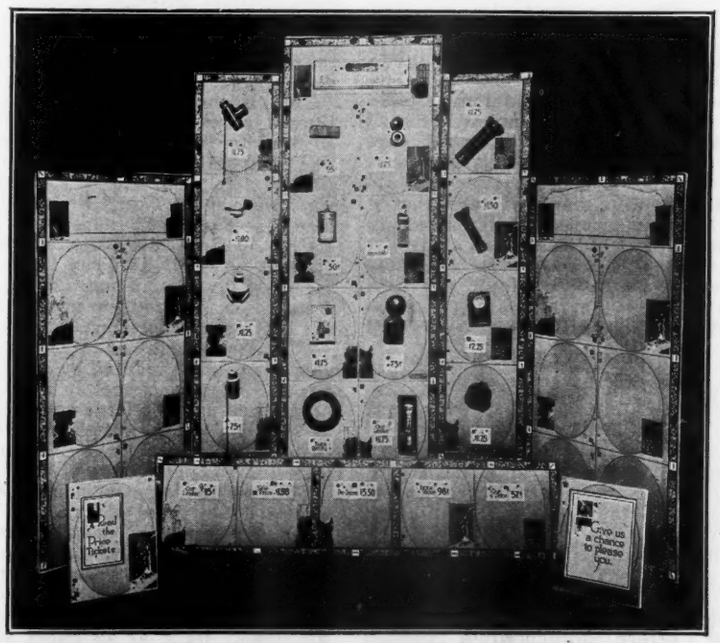


Window Display Showing Layout Suggestion for Use of Eight Display Boards Covered With Art Poster Panels.

Nine poster panel backgrounds, in attractive and seasonable designs and color, lithographed on 6-ply board, are supplied to the subscriber each month. This is enough to cover the 11 display boards. This gives the merchant 12 new and original poster background designs throughout the year. They are designed to act as a practical background for the merchandise and to add the necessary touch of color to secure and hold the eye of the most indifferent. These poster panels are fastened at regular intervals to the display boards with the aid of a brass metal shank, which acts as a decorative feature to the border of the poster panel. By this plan, unsightly wooden frames are done away with. All that is necessary to place the poster panels is lay them over the display boards and fasten them in the required position.

Each month the subscriber is further supplied with 270 price tickets and 180 announcement cards. These price tickets and announcement cards are 2 by 2½ ins. in size and furnished on gummed stock, so that they can be made interchangeable in combination and thereby complete the selling message. They are tastily printed from handmade lettering in keeping with the sales policies of the best stores. The price tickets range in denomination to meet every practical price requirement, and may be cut and pasted together so as to secure any unusual price denomination. These price tickets and announcement cards may be pasted directly on to the poster panels or they can be pasted on to cardboard and cut out and used as individual price tickets on merchandise, both on the interiors and windows of the store.

The subscriber is also furnished each month 54 show cards in various sizes. These are handsomely printed on 6-ply cardboard stock, the same weight as the art posters. They are plain, dignified



Show Window Setting Illustrating Use of Six Pieces of 11-Piece Display Board Set.

and simply lettered in a legible manner, gracefully answering their purpose as an explanation of the window trim. They are cleverly worded and printed from hand lettering. The decorations on the cards are always in harmony with the poster design for the month; and 18 of the cards are sent decorated but left blank for the merchant's individual lettering. Each month, the subscriber will receive four blueprints of practical window settings using parts of the display set in each trim. These window settings are shown with key and complete description for placing. Two of these blueprints each month show decorative settings which differ from the merchandise settings, in the fact that additional inexpensive decorative material of a timely nature is usually required to complete the effect illustrated. They enable the one in charge of your windows to originate many new designs of his own to meet his individual display requirements. The subscriber will receive 48 entirely different window effects throughout the year. If your windows are trimmed frequently, they will stand out strongly in contrast to their surroundings. This service enables you to do this without a great waste of time and effort and at a price you can well afford to pay.

A unique feature of this service is the supplying of small brass metal strips, ranging in size from 4 to 15 ins. These strips can be readily bent and used over and over again, and are for piercing the combination art poster panel and display board, so that merchandise may be directly attached to any part or position on the board. By this plan small merchandise can be displayed directly on the art poster panels in combination with the selling message. These brass strips are the same size and material as the brass shanks used to hold the art poster panels in place on the display boards. Display easels and metal extension anchor bars are also furnished, thereby making it possible to place the display boards securely in any part of the window.

Other important features that the subscriber will secure with each monthly service are described in brief in the following: Monthly Merchants' Calendar —which acts as a "tickler" in reminding the merchant well in advance of the important things he should consider in making his window and interior merchandise displays more attractive and resultful. The Monthly Confidential Letter of display information carries a message which will make the merchant more fully appreciate the great opportunities he has to increase business through his show windows and interior displays. Window Display Reports—a complete treatise on window displays which takes up every important detail. These studies are handsomely illustrated with blue prints and drawings. Trade Paper Review—under this heading hundreds of the leading trade papers are reviewed and the best ideas and suggestions culled for the subscriber. Store Stunts as issued each month are very similar to the Trade Paper Review, except that the ideas do not pertain to displays in the windows, but to the interior —ideas that will lift the store above the ordinary. In other words, ideas that give the public something to think about and talk about and give the store a personality. Show Card Phrases—in addition to the 36 lettered showcards sent with each month's service, a page of well compiled showcard wordings are sent for the merchants' selection to meet local requirements. These wordings are of a seasonable character and may be lettered on the blank showcards by your local card-writer.

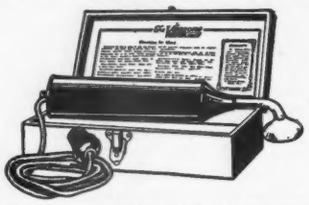
All of this material is sent each month to the subscriber in an attractive file folder which fits the desk drawer or correspondence file. This gives a systematic way for filing monthly suggestions and ideas so that they will automatically come to the merchant's attention when needed. Advice and counsel on any display problem is also given without additional charge to subscribers of this service.

This service will solve many puzzling display problems for the independent dealer and will give him an opportunity to compete in a more high-class manner with chain-store competition through his display methods. Privileges of this service are confined to one merchant in a locality.

An interesting illustrated booklet entitled "Footsteps" further describing this service and giving other information on merchandise displays may be secured from the Sel-Plus Service, 231 West 39th street, New York City.

Virazone Co. Product to Be Made by Renulife Electric Co.

The business of the Virazone Co., Detroit, manufacturers of the "Virazone" violet ray instrument, has been taken over by the Renulife Electric Co., also of Detroit. The latter company has developed an extensive business in the



"Virazone" Violet Ray Instrument.

manufacture and sale of a line of violet ray instruments under the name of "Renulife."

"The "Virazone" will be manufactured by its new owners and added to its line, making the line consist of seven different models. The "Virazone" model is a so-called one piece all in the handle type violet ray instrument. With it is furnished a substantial "Keratol" covered carrying case and a general surface electrode applicator.

The Renulife company states that it has noted an increasing interest among electrical appliance dealers on the violet ray subject, its May business being the largest in the history of the company.

Special Feature of New Eveready Spotlight.

Despite a sluggish market and general business conditions far from ideal, distribution on the new Eveready spotlights, "the flashlight with the 300-ft. range," is proceeding at a rapid rate, according to officials of the American Eveready Works, Long Island City, N. Y.

These spotlights were announced to the trade May 1, and already their sale has equaled the factory's capacity of production on these types. "We have never before introduced a product which has met with such instantaneous acceptance," says Emmet Moore, assistant general sales manager of the American Eveready Works. "The spotlight is essentially an outdoor light," says Mr. Moore, "and we are offering it to the trade just at the beginning of the vacation season. All our consumer-advertising will feature this spotlight for vacation uses, and the dealer who stocks the new types now will surely find a ready market for them."

An interesting experiment was recently conducted by Mr. Moore and R. A. Wentworth, in charge of factory production at the Eveready plant, to determine the greatest distance at which objects could be "spotted" by the spotlight. At 300 ft. Mr. Wentworth could readily distinguish Mr. Moore's movements; at about 400 ft. his white collar could be seen in the spotlight's rays. At even greater distances it was found that although Mr. Wentworth could not

The Eveready Spotlight.

"find" Mr. Moore with the spotlight, Mr. Moore was able to pick a path with the aid of the light thrown.

One very important feature of this flashlight is the small and compact "head" which permits the spotlight to be inserted in the side pocket of an automobile. The extra Eveready mazda lamps carried in the end cap container is a feature which will appeal to dealers and consumers alike, because of its simplicity, practicability and convenience. No more will the burned-out lamp put a flashlight out of commission, for simply by unscrewing the bottom cap another lamp will be found ready for instant use.

Eureka Vacuum Cleaners Popular in Europe.

The demand for United States made products in Europe and the high regard in which these manufactured goods is held is reflected in the following cablegram which was received recently by Fred Wardell, president of the Eureka Vacuum Cleaner Co., Detroit: "Grand Prize and Gold Medal just awarded the Eureka at the Exposition de L' Hygiene, Paris. Signed, Leccoq."

This is the fourth award that the Eureka has earned in Europe in the last 12 mo. In June, 1920, it was awarded the Gold Medal and Grand Prix at Brussels, Belgium, and in July, 1920, it was awarded the Grand Prize and Gold Medal at Exposition Industry at Milan, Italy. In July, 1920, it received the Highest Award Diploma and Gold Medal at the Ideal Home Exposition at Amsterdam, Holland, under the patronage of Queen Wilhelmina.

With the necessity of employing available labor, much reduced by war casualties, the vacuum cleaner in Europe has been seized upon by large hotels, as well as thousands of private homes, as the best means of solving the cleaning problem.

The vacuum cleaner industry is less than a dozen years old and yet it has had one of the most remarkable growths, even rivaling the automobile industry. In the days of reconstruction which we are passing through, a majority of the industries have seized upon the export trade as an outlet to their large production to keep the wheels in their factories busy.

ACTIVITIES IN THE TRADE

Business Developments, Sales Agencies, Trade Literature and Miscellaneous Items Concerning Electrical Manufacturers and Allied Business Interests

Kadison Lighting Co., New York City, has leased property at 15 East 14th street for a new local establishment.

Stenman Electric Valve Grinder Co., Inc., Worcester, Mass., recently changed its name to the Worcester Electric Tool Corp.

Allis-Chalmers Manufacturing Co., Milwaukee, has issued leaflet No. 2056 covering its centrifugal pumps for ice and refrigerating plants.

Dayton-Dowd Co., Quincy, Ill., has issued bulletin No. 244, which illustrates and describes its type CS single-stage centrifugal pumps.

Storage Battery & Appliance Corp. of Pennsylvania, Reading Pa., has filed notice of change of name to the Reading Storage Battery Co.

Automatic Electric Heater Co., Warren, Pa., has issued a bulletin descriptive of its new automatically controlled electric stamp vulcanizer.

Power Specialty Co., 111 Broadway, New York City, manufacturer of superheaters, has filed notice of increase in its capital stock from $270,000 to $950,000.

H. S. Whiting Co., Inc., New York City, manufacturer of industrial lighting units, has moved from 104 East 41st street to room 4839 Grand Central Terminal.

Lehigh Electric Co., Allentown, Pa., has moved its business to a 4-story building at 28 North Sixth street, for proposed expansion and increased operating facilities. A. S. Weibel is head.

Runzel-Lenz Electric Manufacturing Co., 1751 North Western avenue, Chicago, recently celebrated the commencement of its 18th year in business by the occupation of the 3-story addition to its plant.

All-American Cables, Inc., 85 Broad street, New York City, has awarded a contract to John L. Downey, Inc., 410 West 34th street, for the erection of a 6-story building, 46 by 78 ft., at 27-29 Stone street.

William G. Yates Co., Cleveland, has issued a descriptive circular covering its "Cottage" ironer. Several interesting "close-ups" show the exclusive features of this appliance, data and specifications of which appear on the front cover of this issue.

Olson-Boettger Electric Manufacturing Co., St. Paul, Minn., has announced its entrance into the jobbing field. The company has been reorganized and increased the capital stock from $75,000 to $250,000. The name of the new corporation is the Olson-Boettger Electric Co., with H. S. Olson as president and treasurer; J. O. Nelson, secretary, and R. P. Young, vice-president and manager. The corporation will conduct its jobbing business from its 5-story building at 108 East Third street, and the old location at 413 North Franklin street will be used as a repair shop for the rebuilding of motors and generators. It is planned to put seven men on the road to cover Minnesota, North and South Dakota, part of Iowa and Wisconsin.

Atlas Valve Co., 282 South street, Newark, N. J., has issued bulletin No. 5, edition No. 1, entitled "Victor Damper Regulator," No. 3, high pressure. The company states that this regulator is designed for boiler pressures up to 250 lbs.

Allis-Chalmers Manufacturing Co., Milwaukee, has issued bulletin No. 1117 covering small generating sets, which are suitable for isolated lighting and power plants, exciter units in power plants, shipboard service, construction work, etc.

Ernest Distelhorst, Long Island City, N. Y., manufacturer of electric lamps and other electrical specialties, has acquired a factory on Harrison avenue, known as the Forest Smith Mill, formerly used for a woodworking establishment, for a new plant.

Schiefer Electric Co., 614 City Bank building, Syracuse, N. Y., has been appointed to represent the Condit Electrical Manufacturing Co., Boston, and will handle its complete line in the vicinity of Syracuse and the eastern part of New York state exclusive of New York City.

Howard-Geeseka Co., 802 Plymouth building, Minneapolis, Minn., has been appointed representative of the Condit Electrical Manufacturing Co., Boston, and will handle the complete Condit line in the states of Minnesota, North and South Dakota and the northern peninsula of Michigan.

E. G. Bartling, manufacturers' agent, has announced the removal of his office from 628 Detroit Savings Bank building to 703 Ford building, Detroit. He is representing the Fernando C. Mesa Co. of Irvington, N. J.; Federal Porcelain Co. of Carey, O.; Magic Electric Co. of New York City; William Wurdack Electric Manufacturing Co. of St. Louis on their line of switch boxes, and the Eagle Electric Manufacturing Co. of Brooklyn, N. Y.

Laundryette Manufacturing Co., 1190 East 152d street, Cleveland, has issued a folder entitled, "The Laun-Dry-Ette Way on Washday," which sets forth the advantages of the "Laun-Dry-Ette" way of washing over the old-fashioned way. The statement is made that it is never necessary to put hands in the water; no buttons can be torn off, because there is no wringer on this machine; instead the clothes are whirled dry in one minute.

Absolute Contactor Corp. has announced that the growth of its business has been so rapid as to require a complete reorganization and as a result it has been found desirable to remove the factory and general offices to Beloit, Wis. A Chicago sales office will be maintained at 53 West Jackson boulevard. All mail heretofore addressed to 2005 North Karlov avenue, or 128 North Dearborn street, Chicago, should now be addressed to the company at Beloit, Wis.

Duparquet, Huot & Moneuse Co., 312 West Ontario street, Chicago, has a number of its heavy-duty electric kitchen installations embracing ranges, roasters and broilers, placed in Chicago, notably one at the Henrici Restaurant and the employes' cafeteria of Marshall Field & Co. These installations which represent the latest developments in cooking apparatus, attracted many of the delegates to the convention of the National Electric Light Association held in Chicago recently.

Gagen & Becker has been organized by Elvin J. Becker and James M. Gagen to conduct an electrical contracting and engineering business at 750 West 181st street, New York City. Mr. Becker has been engaged for 15 yrs. on large engineering and construction operations throughout the South and Middle West. Mr. Gagen has been identified with the electrical contracting business in New York City for the past 15 yrs., being the founder and president of Gagen & Butler, Inc., from which office he has recently resigned.

Automatic Electric Heater Co., Warren, Pa., has issued a booklet bearing the title of "Hot Water by Wire," which describes the new D type "Sepco" automatic electric water heaters of 3- and 8-gal. capacities. These new heaters are of 600 and 1000 watts demand. The manufacturer states that they are automatic in maintaining their heat at a predetermined temperature, and are suitable for offices, stores, barber shops, soda grills, rest rooms, lavatories and for small homes or bungalows where only a moderate supply of hot water is required.

Baldwin-Hall Co., Syracuse, N. Y., was recently incorporated to do a wholsesale business in electrical supplies and electrical machinery, with Fred S. Baldwin as president and William H. Hall, Jr., secretary and treasurer. Mr. Baldwin started the electrical department of the Syracuse Supply Co., which he continued to operate for 4 yrs., after which he managed the New York office of Pass & Seymour, Inc., later becoming their general sales manager with headquarters at the Solvay (N. Y.) factory, which position he held for 6 yrs.. Mr. Hall was connected with the Syracuse sales force of the Westinghouse Electric and Manufacturing Co. for 11 yrs., after which he became district manager of the Chicago territory for Pass & Seymour, Inc. The Baldwin-Hall Co. has purchased the 4-story building at 309 East Water street, Syracuse.

PERSONAL MENTION

Biographical Sketches and Chronicle of Changes in Business Connections, Promotions and Other Personal News of the Industry

F. P. WILLIAMS, Olean, N. Y., has been appointed secretary of the New York State Water Power Commission.

DAVID F. HOUSTON, former Secretary of Agriculture, has become connected with the American Telephone & Telegraph Co., New York City, in a financial capacity.

ALLAN D. COLVIN, assistant general manager of the Hartford (Conn.) Electric Light Co., has been appointed graduate lecturer in electrical engineering for the graduate school of Yale University, New Haven, Conn.

H. G. THOMPSON has been appointed sales manager of the American Radio & Research Corp., Medford Hillside, Mass. He was formerly general sales manager and vice-president of the Edison Storage Battery Co.

DARWIN CURTIS, of the National X-Ray Reflector Co., Chicago, sailed for Europe recently, where he will spend some time in the interest of his company. While in France, Mr. Curtis expects to visit the battlefields.

DR. IRA N. HOLLIS, president of the Worcester (Mass.) Polytechnic Institute, and a former president of the American Society of Mechanical Engineers, has been elected a trustee of the Wentworth Institute, Boston.

L. H. G. BOUSCAREN, who has been in charge of the engineering and construction interests of Stone & Webster, Inc., in Ohio, has taken charge of the central district office in the First National Bank building, Chicago.

FRANK J. FOLEY, formerly with the Westinghouse Electric & Manufacturing Co. and the Edison Storage Battery Co., is the Chicago representative of the American Radio & Research Corp., Medford Hillside, Mass. Mr. Foley is located at 608 South Dearborn street, Chicago.

R. C. COSGROVE has been appointed manager of the farming section of the Industrial Department, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa. He has been actively in charge of this work for the Westinghouse company since the resignation of R. B. Harvey, several months ago.

H. W. STORTZ, formerly with the Transportation Engineering Corp. of New York City and the Edison Storage Battery Co. of Orange, N. J., is now New York district manager in charge of Twin-R motor and Amrad radio sales of the American Radio & Research Corp., Medford Hillside, Mass. Mr. Stortz is located at 21 Park Row, New York City.

WILLIAM G. YATES, formerly general manager of the Adams-Bagnall Electric Co., and for over 15 yrs. connected with electrical and manufacturing concerns in the Middle West, has recently organized the William G. Yates Co. of Cleveland to manufacture a new, light, household ironing machine, known as the "Cottage Ironer," and described on page 834 of the May 21 issue of ELECTRICAL REVIEW. While with the Adams-Bagnall Electric Co., prior to its absorption last year by the National Screw & Tack Co., Mr. Yates built up a fractional horsepower motor business

W. G. Yates.

from drafting board to over 5000 per month production in less than 9 mo. time, although previously he had been engaged in sales and administrative work and had no manufacturing experience. Associated with him in the William G. Yates Co. will be several men well known in the electrical industry. The company, while "making its bow" with the small family ironer, has several other household electrical appliances fully developed and ready to go into production as rapidly as the business can be organized to handle the future demand for the company's products.

GEORGE F. MITCHELL has been elected treasurer of the Peoples Gas Light & Coke Co., Chicago, to succeed the late J. F. Dougherty. Mr. Mitchell graduated from the George Dewey Grammar School in 1902 and went to work for the American Steel & Foundry Co. when 14 years old. Upon graduating from business college in 1909 he was employed by the Commonwealth Edison Co. as a stenographer in the contract department. On Jan. 1, 1919, when Samuel Insull became president of the Peoples Gas Light & Coke Co., Mr. Mitchell was made assistant to the president and given supervision over all purchasing.

J. B. ODELL, who was recently appointed manager of the telephone distributing house of the Western Electric Co. at New York City, has been connected with the company for the past 17 yrs., starting in at New York. He went to Hawthorne, Ill., in 1908, returning to New York a year later to take charge of the equipment division of the telephone department. During the past decade he has acted as assistant manager of the telephone department, telephone department storekeeper and assistant stores manager, all at New York City, and manager at Richmond.

DAVID D. GIBSON, JR., formerly with Stone & Webester, Inc., New York City, as a designer, is now connected with the Y. M. C. A. Extension School of New York City as associate head of the electrical department.

WILLIAM H. HOLDORF, who was recently appointed manager of the Western Electric Co. at St. Paul, Minn., to succeed A. L. Frankenberger, started with the company as a sales specialist at Minneapolis in August last.

W. B. DEFOREST, who was recently appointed manager of the Western Electric Co. at Kansas City, Mo., has spent 12 yrs. with the Kansas City house, with the exception of 4 mo. at St. Louis in 1912. He joined the Kansas City office as a salesman and has been telephone and farmlight specialist and sales manager.

G. T. MARCHANT, who was recently appointed manager of the Richmond, Va., office of the Western Electric Co., started with the company in 1908 as a stock records clerk at Atlanta, Ga., later joining the sales department. He became connected with the Richmond office in 1911, being appointed assistant sales manager in 1914 and sales manager in 1918.

E. A. BREHM, who was recently appointed manager of the telephone distributing house of the Western Electric Co. at Philadelphia, started with the company in 1910 as a student at the Hawthorne (Ill.) plant. Later he was connected with the Dallas, Houston and Cleveland offices, going to Philadelphia in 1917, being appointed stores manager at the latter house in 1919.

OBITUARY.

HENRY C. JONES, of Pontiac, Ill., who was prominently identified with the upbuilding of the Pontiac Light, Heat & Power Co., and who was president of the company for 7 years, died June 13.

ERNEST F. HULLQUIST, former superintendent of the plant of the Griscom-Russell Co., manufacturer of heaters, evaporators, multiwhirl coolers, separators, and other specialties, Massillon, Ohio, died June 10 at his home in that city.

BERTRAM D. WILBER, state engineer for the Indiana Bell Telephone Co., died June 9 at his home in Indianapolis, aged 47 years. He was born in Grand Rapids, Mich., and after graduating from the University of Michigan in 1899 was employed by the Western Electric Co., later entering the employ of the Central Union Telephone Co.

BUSINESS OPPORTUNITIES

News of Electrical Construction Projects in All Parts of the Country, Proposals Invited, Foreign Trade Openings and New Companies

EASTERN STATES.

Boston, Mass.—The Edison Electric Illuminating Co. has acquired property on Pine street, to be used in connection with operations in the Broadway extension district.

Danvers, Mass.—Considerable electrical equipment will be installed in the automobile assembling plant to be erected on a local site by the Romer Motors Corp., 51 Cornhill street, Boston, estimated to cost $100,000. Albert J. Romer is president and general manager.

Lawrence, Mass.—The American Woolen Co. has awarded a contract to the Turner Construction Co., 178 Tremont street, Boston, for the erection of a new 2-story power plant at its local mill, 80 by 20 ft., to cost about $50,000.

New Bedford, Mass.—The New Bedford Gas & Edison Light Co. has been granted permission by the Department of Public Utilities to issue capital stock to an amount of 5724 shares at $120 a share, the proceeds of $686,880 to be used to defray expenses in connection with plant additions, operations etc.

Reading, Mass.—The Commonwealth of Massachusetts, Metropolitan District Commission, 18 Tremont street, Boston, will build an electrically operated pumping plant at Reading, estimated to cost $40,000.

Springfield, Mass.—The United Electric Co. has awarded a contract to E. T. Davis & Son, 157 Lebanon street, for the erection of a 1-story addition to its substation on the exposition grounds, to cost about $10,000.

Worcester, Mass.—The New England Power Co., Harvard street, has preliminary plans under way for the erection of a hydroelectric generating plant on the Deerfield river, near Searsburg, Vt., to cost about $1,500,000.

Buffalo, N. Y.—The City Council has awarded a contract to the Buffalo General Electric Co. for the installation of a new street-lighting system on Genesee street, from Jefferson street to Bailey avenue, using magnetite lamps, at a cost of $109 a lamp.

Concord, N. Y.—The Iroquois Utilities, Inc., is perfecting plans for the erection of an addition to its local power plant.

Corinth, N. Y.—The Corinth Electric Light & Power Co. has made application to the Public Service Commission for approval of franchise to install and operate an electric system in the eastern district of Corinth township for a period of 10 yrs.

Depew, N. Y.—The Depew & Lancaster Light, Power & Conduit Co. has completed plans for the erection of an addition to its power plant. Permission for erection will soon be granted by the Public Service Commission.

Fine (St. Lawrence County), N. Y.—The Wanakena Light & Power Corp, has been incorporated with a capital of $10,000 to operate a local light and power system. The incorporators are J. F. Dubar, J. O. Hamele and F. M. Duryea. W. B. Van Allen, Carthage, N. Y., represents the company.

Glens Falls, N. Y.—The International Paper Co., 38 Broad street, New York City, will break ground at once for the erection of its proposed hydroelectric power plant at Glens Falls, estimated to cost $2,500,000. The Parklap Construction Co., 84 Pine street, New York City, is contractor.

Long Island City, N. Y.—The Loft Candy Co., Broome and Centre streets, New York City, has completed plans for the erection of a power house at its factory at Pyntar street and Hamilton avenue.

New York, N. Y.—The New York Edison Co., 130 East 15th street, has awarded a contract to the Kennwell Contracting Co., 841 Broadway, for the erection of a 3-story substation, 50 by 100 ft., at 159-61 Greene street, to cost about $160,000.

Rochester, N. Y.—The Rochester Gas & Electric Corp., will issue certain securities for additions to its plant at an estimated cost of $1,512,241. This includes an addition to the coal-gas plant in Rochester, N. Y., to cost about $600,000, 60-cycle transmission line to be built between Rochester and Canandaigua, extension to gas mains and electric distribution system, new meters and other equipment.

Rochester, N. Y.—The Public Service Commission has granted permission for a merger of the Rochester Corp. with the New York Telephone Co., and authority to issue securities for $8,000,000 to perfect the consolidation.

Roxbury, N. Y.—The Roxbury Light & Power Co., Inc., has made application to the Public Service Commission for permission to operate under franchise and build a transmission line from near Grand Gorge station through the town of Roxbury and there build and operate a transmission line to serve electricity for light, heat and power. The company plans to issue $20,000 in common stock. The estimate cost of the work will be $13,000. Address Arthur F. Bouton, president.

Watertown, N. Y.—The Northern New York Utilities, Inc., has arranged for a bond issue for $1,200,000, for extensions, operations, etc. The company is now operating generating plants with a total installed capacity of 27,550 hp., and a steam-operated auxiliary station. J. N. Carlisle is president.

Millville, N. J.—Considerable electrical equipment will be installed in the 1 and 2-story mill to be erected by the Millville Pulp & Pine Products Corp. J. W. Arthur, Old Opera House building, Millville, is architect. E. H. Hults, 218-20 Walnut street, Philadelphia, is president.

Morris Plains, N. J.—The Board of Education, Hanover Township, will soon receive bids for electrical, heating and ventilating work in a new local school building. W. T. Leighton, Tabor, is district clerk. Rasmussen & Wayland, 252 West 46th street, New York City, are architects.

Perth Amboy, N. J.—The Board of Aldermen has commenced the installation of the proposed new municipal "white way" lighting system on Madison avenue, from Market street to New Brunswick avenue.

Trenton, N. J.—Electric equipment will be installed at the proposed sewerage disposal plant to be constructed by the city at a cost of about $750,000. The City commission is in charge.

Millsboro, Del.—Bids were received this week for the issuance of $25,000 water and light bonds. Address the town clerk.

Bloomsburg, Pa.—The Pennsylvania Power & Light Co., Allentown, Pa., has taken title to property at the mouth of Roaring creek, near Bloomsburg, to be used as a site for the erection of a steam-operated generating plant. The water supply from Roaring creek will be utilized for boiler service. A transmission system will be built to connect the lines of the company in Central Pennsylvania with the new plant. The project is estimated to cost $3,000,000. The Electric Bond & Share Co., 71 Broadway, New York City, operates the company. Construction of the new plant will be inaugurated early in July.

North Clairton, Pa.—The Borough Council has awarded a contract to the Duquesne Light Co. for furnishing electric service for lighting the streets of the municipality for a period of 5 yrs.

Philadelphia, Pa.—Considerable electrical equipment will be installed in the cold storage plant to be erected by the Farmers' Cold Storage Co., 1003 Liberty building, at Tacony. It will be 4-story, 90 by 100 ft., and is estimated to cost $200,000 with machinery. G. M. Miller is head.

Philadelphia, Pa.—W. H. & E. A. Margerison & Co., Jasper and Huntingdon streets, are having plans prepared for the erection of a power house at their towel factory.

Philadelphia, Pa.—The Bureau of Health will soon commence the construction of a 1-story power plant at

34th and Pine street for department service. Philip H. Johnson, 1713 Sansom street, is architect. C. L. Furbush, City Hall, is director.

Pittsburgh, Pa.—The Duquesne Light Co. has called a special meeting of stockholders July 26, to approve an increase in its capital stock from $34,822,300 to $59,822,300, the proceeds to be used for extensions, operations, etc. W. B. Carson is secretary.

Pittsburgh, Pa.—The City Council is planning the installation of an underground conduit system on Second avenue, between Liberty avenue and Ferry street.

Pittsburgh, Pa.—The Department of Public Works has plans under way for a new street-lighting system on Bigelow boulevard, East Ohio, and Ferry streets, and Second avenue, comprising cluster street lamps with underground wires. All present overhead wires will be removed and placed in underground conduits. Norman F. Brown is director.

Reading, Pa.—The City Council has plans under way for the construction of an electric power plant on Madden creek. E. B. Ulrich, City Hall, is engineer; Louis T. Klauder, Pennsylvania building, Philadelphia, is consulting engineer.

York, Pa.—The City Council is planning extensions and improvements in the municipal disposal plant for sewerage to cost about $150,000, including new electrical and other equipment.

Annapolis, Md.—The Public Service Commission has granted permission to the Harpers Ferry Electric Light & Power Co., Harpers Ferry, to extend its transmission lines in Frederick county.

Baltimore, Md.—The Standard Oil Co., Third avenue, has filed plans for the construction of a 1-story power house addition at its local plant, to cost about $50,000.

Baltimore, Md.—The American Car & Foundry Co., Curtis avenue and Locust street, will build a 1-story power house to cost about $20,000.

Baltimore, Md.—The American Sugar Refining Co. will construct a 2-story power house at its new plant at Woodall and Clement streets. Stone & Webster, Inc., New York City, has the erection contract.

Laurel, Md.—The Industrial Power Corp., recently organized, has acquired the old mill property of the Mt. Vernon-Woodberry Mills, Inc., comprising about 216 acres of land, with water power rights. The new company is said to be planning to use the property for power development. Robert J. and Albert S. Gill, 224 St. Paul street, Baltimore, are interested in the new organization.

Union Bridge, Md.—The Union Bridge Electric Co. has made application to the Public Service Commission for permission to issue bonds for $10,000, for betterments, etc.

Washington, D. C.—The Potomac Electric Power Co. is planning the erection of a new substation, estimated to cost $10,000.

Kingwood, W. Va.—The West Virginia & Maryland Power Co. has been incorporated with a capital of $50,000 by Carleton C. Pierce, Kingwood, and N. M. Seabrease, Philadelphia.

Union, W. Va.—The Union-Fort Spring Power Co. has been incorporated with a capital of $30,000 to operate a local light and power system. C. W. Boon, Union; and W. H. Garnett, Fort Spring, W. Va., head the company.

Siler City, N. C.—The City Council has preliminary plans under way for the construction of a municipal hydroelectric power plant on the Deep river.

Greenwood, S. C.—The Greenwood Water & Light Co. will install transformers and regulators in the plant to double capacity; and increase the number of street lamps from 200 to 400. Address A. J. Sproles, superintendent.

Williston, S. C.—The city voted bonds to the amount of $30,000 for electric light and water systems. Address W. E. Protho, commissioner of public works.

Thomaston, Ga.—The Thomaston Cotton Mills will erect a power plant to develop electricity for its mills. Address R. E. Hightower, president.

Miami, Fla.—The Miami Electric Light & Power Co. is planning extensions and improvements at its steam-operated electric power plant, estimated to cost $275,000. The larger portion of the amount will be used for the purchase of new machinery. A meter repair shop will also be constructed. H. H. Hyman is general manager.

Plant City, Fla.—The City Council is planning a bond issue of $150,000 for the construction of a municipal electric power plant, with city ice-manufacturing plant.

NORTH CENTRAL STATES.

Decatur, Mich.—By a vote of 209 to 18, Decatur decided at the recent election to grant the Michigan Gas & Electric Co. a franchise to furnish all homes with electric lights. The company recently purchased all the poles and wire owned by the village.

Detroit, Mich.—The Detroit Edison Co. is having plans prepared for extensions in its transmission system in the vicinity of Monroe, Mich.

East Lansing, Mich.—The Michigan Agricultural College has taken bids for the construction of a 1-story power plant at the institution, 48 by 136 ft., estimated to cost $100,000 with machinery.

Royal Oak, Mich.—J. A. Merritt, president of the Royal Oak Real Estate Board, appointed himself a committee of one to present a petition to the village commission asking for a boulevard lighting system on Main street and Washington Avenue.

Shelbyville, Ind.—The council has been petitioned to improve the lamps in the parks. Address Lee B. Carithers, chairman of the board.

Danville, Ill.—The boulevard plan of ornamental lighting for the business district of the city will be discussed from various angles at the regular meeting. The entire cost of construction is estimated at $35,023.42. Address city clerk.

East St. Louis, Ill.—A campaign for the installation of street lamps on Collinsville avenue between Broadway and Illinois avenue has been launched. Plans are to erect tall iron posts with lamp globes every 75 ft. This will make a total of 54 poles, with a cost of more than $11,000. Address city clerk.

Flora, Ill.—Bonds to the amount of $29,100 were issued to improve the electric light plant. Address I. Bowman, chairman of the committee.

Roscoe, Ill.—The Roscoe Electric Co., of which Stuart Ralston is general manager, purposes extending its system to serve Harlem and vicinity.

Fond Du Lac, Wis.—A. B. Barfield, sales manager for the utility corporation, operating a power and light station at Kilbourn and supplying electrical current to Campbellsport, Byron, Eden and Marblehead, was in Fond Du Lac recently figuring on an extension of the company's line to Lake deNeveu. There is a concerted movement on the part of the cottagers to encourage the company to bring its lines to the lake. The cottagers plan the installation of lamps. Farmers in Empire are also prospective consumers of the line, and they too are offering inducements to the company to extend its lines.

Milwaukee, Wis.—The Milwaukee Gas Light Co. has petitioned for authority to issue $1,000,000 in bonds to be used for extension of service. Address R. B. Brown, general manager.

Duluth, Minn.—The City Commissioners ordered the Duluth Edison Electric Co. to install cluster lamps, ornamental type, on the following streets and intersections of Woodland avenue: Allen, Clover, Jaskson, Manitoba, Niagara, Elizabeth, Norton, Bruce, Victoria, Hardy and St. Marie streets. Address P. G. Phillips, commissioner.

Mankato, Minn.—The Northern States Power Co., 15 South Fifth street, Minneapolis, Minn., has purchased a site at West Front and Moreland avenue for the erection of a transformer.

Redwood Falls, Minn.—The city will install a "white way" system and bonds to the amount of $8,000 will be voted. The installation will cost $14,000. Address H. O. Rutter, city clerk.

Bedford, Ia.—Bids were received this week for an extension to the waterworks system. The specifications included one 900 g. p. m. horizontal centrifugal pump connected to 15-hp., 220-volt motor to operate against 40 ft. head; 630 g. p. m. pump connected to 15-hp., 220-volt motor to operate against 40-ft. head; two 220 g. p. m. pumps connected to 3-hp. motors; one 200 g. p. m. pump connected to 3-hp. motors; two 150 g. p. m. pumps connected to 2-hp. motors. Henningson Engineering Co., engineers, third floor, National building, Omaha, Neb. Address J. E. Lowell, city clerk.

Iowa Falls, Ia.—Plans are in progress for building a municipal electric

lighting plant to cost $150,000. Bonds to the amount of $150,000 will be voted. Address the mayor.

Remsen, Ia.—Bonds to the amount of $60,000 have been voted to erect a municipal light and power plant. Address the mayor.

Chillicothe, Mo.—The Board of Public Works has taken bids for extensions in the municipal electric lighting plant, with equipment to be installed including generator, exciter, condensors and auxiliary operating equipment; steam boilers, pumps, etc. E. E. Harper, 3031 Park avenue, Kansas City, Mo., is engineer.

Joplin, Mo.—Considerable electrical machinery will be installed in the local automobile tire manufacturing plant to be erected by the Duplex Tire & Rubber Co., (R. W. Crissey, New Yates hotel, president) estimated to cost $150,000. The Osborn Engineering Co., 2848 Prospect street, Cleveland, is engineer.

Sedalia, Mo.—The Chamber of Commerce is perfecting plans for the installation of new ornamental street lamps, comprising about 175 standards, as an extension to the present system. The improvement is estimated to cost $40,000.

St. Louis, Mo.—The Dixie Power Co., Title Guaranty building, has applied to the Federal Power commission for a preliminary permit to construct a dam for power development in the North Fork White river near its junction with the White river in Baxter county, Arkansas. The proposed use is for public utility purposes.

Lawrence, Kan.—The Kansas University has taken bids for the erection of a 2-story power plant at the institution to cost about $100,000. J. A. Kimball, Topeka, Kan., is business manager.

SOUTH CENTRAL STATES.

Water Valley, Ky.—The Water & Light Co. has been incorporated with a capital of $50,000 by Ben Bennet and T. E. Baker.

Cookeville, Tenn.—The Common Council has disposed of a bond issue of $100,000, the proceeds to be used for a new municipal hydroelectric power plant.

Meridian, Miss.—The City Council has authorized a bond issue, recently approved by citizens, for $600,000 for the erection of a municipal electric power plant.

Comanche, Okla.—The City Council has approved a bond issue of $275,000 for the installation of a municipal electric power plant, in conjunction with waterworks and sewerage system.

Cushing, Okla.—The city is extending its electric light system and will construct 15 mi. of poles and wire. Address the mayor.

Hugo, Okla.—The Chamber of Commerce is at the head of a project for the construction of a hydroelectric generating plant, near Hugo, with total development in excess of 150,000 hp.

Sayre, Okla.—The Town Council has arranged a bond issue of $35,000 for the construction of a municipal electric power plant. Benjamin Turner, superintendent of utilities, is in charge.

Cross Plains, Tex.—The Cross Plains Power & Light Co., has been incorporated with a captial of $25,000 by S. F. Bond, Taylor Bond and T. C. Cross.

WESTERN STATES.

Centennial, Wyo.—The Colowyo Gold Mining Co. has applied to the Federal Power Commission for a preliminary permit to construct a small diversion dam, pipe line and powerhouse in the middle fork of the Little Laramie river, 4 mi. from Centennial, Albany county, Wyoming, to be used for mining purposes.

Centralia, Wash.—A municipal lighting plant to cost $75,000 will be erected in Centralia at once according to an ordinance passed by the City Commissioners. Bonds to finance the erection will be retired with the profits of the lighting department. The new plant will generate enough power to care for all industries, it is stated.

Modesto, Cal.—An agreement was entered into between Modesto and Turlock irrigation districts and the Pacific Gas & Electric Co. whereby an extension power line will be built from Lagrange about 7 mi. to the dam site. In the contract the districts agree to take power beginning with 100 hp. and increasing up to 800 or 900 hp. as the work develops. In the joint meetings of the boards the engineers were instructed to go ahead with the establishment of the commissary and to hire whatever help is necessary.

San Diego, Cal.—Ed. Fletcher, 920 Eighth street, has applied to the Federal Power Commission for a preliminary permit for a diversion dam in Boulder creek, and a conduit 4.5 mi. to the power house on the same stream to be used as a public utility.

Seward Peninsula, Alaska.—The Saw Tooth Power Co., care of Frank B. Colton, attorney, 256 Broadway, New York City, has applied to the Federal Power Commission for a preliminary permit for a comprehensive development of power in Pass creek and tributary streams, in Kongarok Precinct, Seward Peninsula, Alaska, to be used for mining.

INCORPORATIONS.

Toronto, Ont.—Electric Refrigerators, Ltd. Capital, $40,000. To manufacture refrigerators, etc. Incorporators: R. L. Kellock, Harold W. Keyes and F. C. Carter.

Evansville, Ind.—Hoosier Farm Light Co. Capital, $150,000. To manufacture farm-lighting systems. Incorporators: J. Morris, W. A. Koch and Charles F. Dickmann.

Boston, Mass.—Massachusetts Radio & Telegraph Co. Capital, $20,000. To manufacture radio and other electrical equipment. Guy R. Entwistle is president: Ramond F. Trop, Atlantic, Mass., treasurer.

Boston, Mass.—Arvedon Electrical Supply Co. has filed notice of organization to deal in electrical goods. Louis Arvedon, 114 Portland street, heads the company.

New York, N. Y.—H. J. Shaffer & Co., Inc. Capital, $35,000. To manufacture motors, etc. Incorporators: H. J. Shaffer, W. L. Coston and W. C. G. Wahle. Dunn & Daly, 261 Broadway, represent the company.

New York, N. Y.—Walter Knapp & Co., Inc. Capital, $10,000. To manufacture electrical devices and systems. Incorporators: Walter Knapp, J. J. Rathgeb, Jr., and F. H. Sander. Weissberger & Leichter, 93 Nassau street, head the company.

Buffalo, N. Y.—Pyramid Engineering Co. Capital, $25,000. To manufacture power-hoisting equipment, etc. Incorporators: M. P. Ryley, H. J. Auer and F. R. Carlon.

New York, N. Y.—Neon Lamp Works, Inc. Capital, $9000. To manufacture and deal in arc lamps. Incorporators: D. G. Albert, C. H. Carter and C. G. Katz. Borowsky & Burrows, 132 Nassau street, represent the company.

Newark, N. J.—The T. & G. Co. Capital, $50,000. To operate as an electrical contractor. Incorporators: E. C. Thornton, Ralph Damino and M. E. Grosser, 4 Hawthorne avenue.

Newark, N. J.—Herman Gumz Boiler Works, Inc. Capital, $100,000. To manufacture boilers and kindred equipment. Incorporators Herman H. Gumz, Andrew W. Stevenson and Frank Mullins.

Newark, N. J.—Golatz Electric Co., 83 Springfield avenue, has filed notice of organization to manufacture electrical products. Philip Golatz, 695 South 19th street, heads the company.

Pittsburgh, Pa.—Pittsburgh Fire Alarm Co. Capital, $50,000. To manufacture fire-alarm equipment and systems. J. H. Forrest, 4121 Bristol street, is treasurer.

FOREIGN TRADE.

[Addresses of firms referred to in these trade opportunities may be obtained by writing to the Bureau of Foreign and Domestic Commerce, Washington, D. C., or its branch and local co-operative offices. Request for each opportunity should be on a separate sheet and the file number given.]

Washing Machines (34,959)—A mercantile firm in Canada desires to purchase washing machines. Quotations should be given f. o. b. port of shipment. Payment to be in cash. Shipment may be made all rail. Reference.

Electrical Machinery (34,983)—The representative of a group of manufacturers in China is in the United States and desires to form direct connections with manufacturers of machinery for mining and electric power plants, transmission equipment, telephone equipment, etc. Quotations should be given f. o. b. American port. Payment, cash against documents. Catalogs, price lists and full information are requested. Reference.

Electrical Apparatus (34,999)—The industrial representative in the United States of a European country desires to secure catalogs and quotations from manufacturers of electrical machinery, apparatus, supplies and insulating materials; machine tools, transportation equipment and labor-saving devices.

FINANCIAL NEWS

Comment on the Financial Outlook in the Electrical Industry, New Securities, Reports of Earnings, Dividends and Utility Stocks

Bankers Adopt Resolution on Financing of Foreign Trade.

Practical support to the plan of the organizers of the Foreign Trade Financing Corp. to create adequate financial machinery, under the Federal Reserve Act for the extension of long-time credits in the furtherance of America's foreign trade, has been given by the Pennsylvania Bankers' Association. At its annual meeting at Atlantic City recently the Association adopted a resolution setting forth the imperative need for the construction of financial machinery through which existing foreign markets for American goods and products may be sustained and stabilized, new markets developed and old markets for American goods and products revived.

The resolution continues: "The Pennsylvania Bankers' Association hereby approves the plans for the formation of a corporation for the financing of foreign trade, urges upon its members the desirability of giving this natfonally important undertaking support in every practical way, and authorizes and directs the incoming president to appoint a committee of seven to carry out the purpose of this resolution."

Sinking Fund Call for Standard 6% Bonds.

The Philadelphia Trust Co., trustees for the Standard Gas & Electric Co. convertible 6% sinking fund gold bonds, due Dec. 1, 1926, is advertising for offers of the bonds to absorb an amount of $74,-773.80, now available under the sinking fund provision. Tenders are to be addressed to the Philadelphia Trust Co., trustee, Broad and Chestnut streets, Philadelphia, and will be received up to 3 p. m., July 7, 1921.

Bonds of Central Illinois Utility to Be Issued.

Authority to issue $151,000 5% first and refunding mortgage gold bonds, to mature Aug. 1, 1951, has been granted the Central Illinois Public Service Co., which serves 180 communities, by the Illinois Public Utilities Commission. Permission has also been given for issuance of 50,000 6% general mortgage gold bonds, of the same maturity. This company has started removal of its general offices from Mattoon to Springfield.

Southern California Edison Co.

Month of April—	1921.	1920.
Gross earnings	$1,296,376.58	$1,005,744.40
Expenses and taxes	564,197.62	373,615.95
Net earnings	732,178.96	632,128.45
Fixed charges	261,572.10	253,829.14
Balance	470,606.86	378,299.31
12 mo. ending April 30, 1921—		
Gross earnings	15,829,790.09	11,122,815.42
Expenses and taxes	6,737,166.60	4,973,817.52
Net earnings	9,092,623.49	6,148,997.90
Fixed charges	3,253,136.41	3,050,396.34
Balance	5,839,487.08	3,098,601.56

Cities Service Co.

	1921.	1920.
April gross	$1,425,203	$2,175,658
Net earnings	1,382,446	2,117,700
Surplus after interest charges	1,212,090	1,961,598
Balance after preferred dividends	807,930	1,576,536
12 mo. gross	22,256,987	20,988,330
Net earnings	21,578,167	20,299,401
Surplus after interest charges	19,609,833	18,334,536
Balance after preferred dividends	14,843,316	13,955,139

American Power & Light Co.'s Subsidiary.

	1921.	1920.
April gross	$2,083,403	$1,648,524
Net earnings	758,235	621,328
12 mo. gross	23,677,116	17,673,669
Net earnings	7,751,875	6,757,134

Consumers Power Co. and Michigan Light Co.

	1921.	1920.
April gross	$1,219,584	$1,129,575
Net after taxes	547,747	433,366
Surplus after fixed charges	355,836	257,686
Balance after preferred dividends	286,296	193,116
12 mo. gross	14,449,311	12,384,175
Net after taxes	4,754,247	4,371,590
Surplus after fixed charges	2,540,635	2,620,514
Balance after preferred dividends	1,743,195	1,848,545

Northern Ohio Electric Corp.

	1921.	1920.
April gross	$ 744,673	$ 962,371
Net after taxes	147,588	282,966
Deficit after fixed charges	5,394	*151,541
Deficit after preferred dividends	35,394	*121,541
12 mo. gross	10,410,139	10,188,418
Net after taxes	2,032,614	2,893,131
Surplus after fixed charges	286,348	1,347,092
Deficit after preferred dividends	73,651	*987,092

*Surplus.

Southwestern Power & Light Co.'s Subsidiary.

	1921.	1920.
April gross	$ 838,154	$ 687,335
Net earnings	347,974	283,700
12 mo. gross	10,308,452	7,173,736
Net earnings	3,670,841	2,851,416

Texas Power & Light Co.

	1921.	1920.
April gross	$ 374,607	$ 331,387
Net after taxes	109,415	106,299
Total income	110,025	106,988
Surplus after charges	52,244	50,959
12 mo. gross	5,192,495	3,735,237
Net after taxes	1,434,781	1,274,169
Total income	1,439,291	1,281,622
Surplus after charges	731,186	624,586
Balance after preferred dividends	459,061	376,086

West Penn Traction & Water Power Co.

For the year ended Dec. 31, 1920, the West Penn Traction & Water Power Co reports surplus after taxes, interest, amortization and accrued dividends on preferred stocks of West Penn Railways Co. and West Penn Power Co. of $1,256,-495, as compared with $1,187,114 in 1919. Consolidated income account for the year 1920 compares as follows:

	1920.	1919.
Gross	$13,607,949	$10,634,611
Net after expenses and taxes	3,357,507	3,270,868
Other income	550,294	453,201
Total	3,907,801	3,724,069
Interest, amortization and accrued dividends on West Penn Railways and West Penn Power preferred stocks	2,651,305	2,536,935
Surplus	1,256,495	1,187,114

Montana Power Co.

For the 4 mo. ended April 30, 1921, net income after charges and taxes was $733,-427, equal after preferred dividends to $1.14 a share on $49,633,300 outstanding common.

Dividends.

	Term.	Rate.	Payable.
Asheville P. & L. Co., pfd.	Q	1.75%	July 1
Car. Pr. & Lt., pfd.	Q	1.75%	July 1
Am. Gas & El., com.	Q	2.5%	July 1
Am. Gas. & El., com. stk.	—	2%	July 1
Am. Gas & El., pfd.	Q	1.5%	Aug. 1
Am. Pr. & Lt., pfd.	Q	1.5%	July 1
Consumers Pr., pfd.	Q	1.5%	July 1
Dayton Pr. & Lt., pfd.	Q	1.5%	July 1
Cent. States El., pfd.	Q	1.75%	July 1
Colum. El.	SA	3%	July 1
Dul. Ed. El., pfd.	Q	1.5%	July 1
Duquesne Lt., pfd.	Q	1.75%	Aug. 1
Erie Lighting, pfd.	Q	1.75%	July 1
East. Tex. El., com.	Q	$2	July 1
East. Tex. El., pfd.	SA	$3	July 1
Ottawa Lt., H. & Pr.	Q	1.5%	July 1
Panama Pr. & Lt., pfd.	Q	1.75%	July 1
Utah Pr. & Lt., pfd.	Q	1.75%	July 1
Yadkin River Pr., pfd.	Q	1.75%	July 1

WEEKLY COMPARISON OF CLOSING-BID PRICES OF SECURITIES OF LEADING ELECTRICAL COMPANIES.

Quotations furnished by F. M. Zeller & Co., Rookery Bldg., Chicago.

Public Utilities.	Div. rate. Per cent.	Bid June 13.	Bid June 20.
Adirondack Electric Power of Glenns Falls, common	6	10	9
Adirondack Electric Power of Glenns Falls, preferred	6	72	74
American Gas & Electric of New York, common	..	101	102
American Gas & Electric of New York, preferred	6	38	37
American Light & Traction of New York, common	..	81	76
American Light & Traction of New York, preferred	6	79	80
American Power & Light of New York, common	4	58	54
American Power & Light of New York, preferred	6	72	64
American Public Utilities of Grand Rapids, common	..	7	7
American Public Utilities of Grand Rapids, preferred	7	18	17
American Telephone & Telegraph of New York	..	104	105
American Water Works & Elec. of New York, common	..	4½	4
American Water Works & Elec. of New York, particip	7	8	8
American Water Works & Elec. of New York, 1st preferred	..	49	50
Appalachian Power, common	..	4	4
Appalachian Power, preferred	7	29	29
Cities Service of New York, common	+extra	124	130
Cities Service of New York, preferred	6	40	48
Commonwealth Edison of Chicago	8	107	107
Comm. Power, Railway & Light of Jackson, common	..	10	10
Comm. Power, Railway & Light of Jackson, preferred	6	30	29
Federal Light & Traction of New York, common	..	6	6
Federal Light & Traction of New York, preferred	..	42	41
Northern States Power of Chicago, common	..	47	47
Northern States Power of Chicago, preferred	ex.div.7	80	80
Pacific Gas & Electric of San Francisco, common	..	49	52
Public Service of Northern Illinois, Chicago, common	7	80	78
Public Service of Northern Illinois, Chicago, preferred	6	80	78
Standard Gas & Electric of Chicago, common	..	10	10
Standard Gas & Electric of Chicago, preferred	8	33½	33
Tennessee Railway, Light & Power of Chattanooga, common	..	1	1
Tennessee Railway, Light & Power of Chattanooga, preferred	6	5	5
Western Power of San Francisco, common	..	27	24
Western Union Telegraph of New York	..	88	90
Industrials—			
General Electric of Schenectady	8	126	123
Westinghouse Electric & Mfg. of Pittsburgh, common	7	45	43¼

Contractor-Dealer Issue

Electrical Review

Vol. 78. No. 26. CHICAGO, JUNE 25, 1921. Three Dollars a Year.

UNIVERSITY OF CALIFORNIA
THE LIBRARY
JUN 28 1921

$100.00

Will Iron Ruffles of Any width

Local Advertising Our Money is being spent for LOCAL Advertising

Full size 46 inch ROLL

Pri
$100
Popular Price
Rapid Seller

It Irons Beautifully and it Irons Everything

FROM the trade standpoint, the Cottage Ironer has one outstanding advantage—PRICE. But in offering this very marketable appliance at the One Hundred Dollar price, we have not sacrificed strength, durability or completeness.

FOR the Cottage Ironer is a complete household ironer. It will do any work which a home ironing machine can reasonably be expected to do, and in addition it will perform several operations which no other ironer now on the market can—notably the ironing of deep ruffles, and the pressing of skirts, trousers, etc. Write for descriptive literature.

THE Cottage Ironer is built for volume sales. It is offered to dealers who control or who are in position to develop tonnage business. More money will be spent LOCALLY, per machine, to introduce and build up a demand for the Cottage Ironer than ever has been spent in promoting the sale of any similar electrical appliance.

SPECIFICATIONS

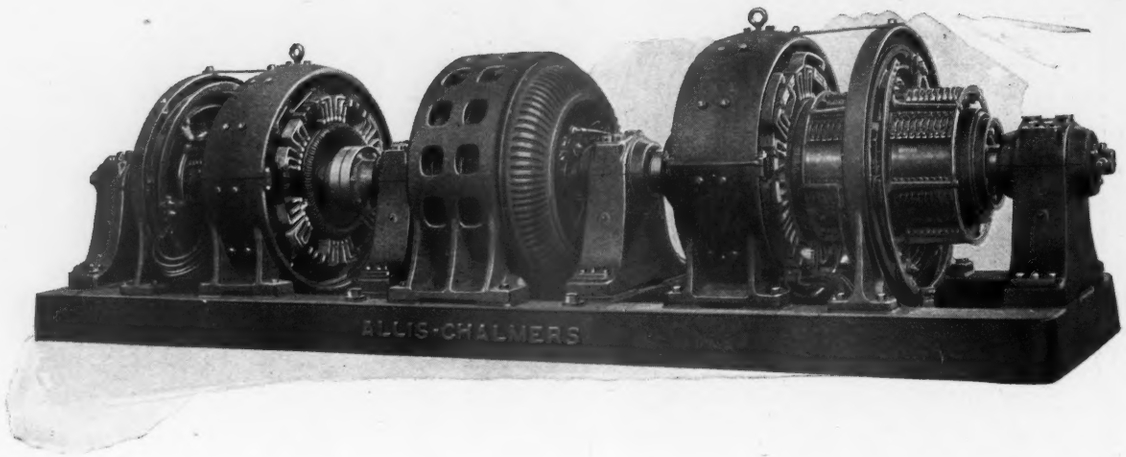
(Subject to Improvement)

Floor Space	21½x54 inches
Weight	142 pounds
Motor	⅛ horsepower
Width of Roll	46 inches
Diameter of Roll	6½ inches
Speed of Roll	8 ft. per minute
Lift of Shoe from Roll	4½ inches
List Price	$100

THE WILLIAM G. YATES CO.

CLEVELAND, OHIO, U.S.A.

ALLIS-CHALMERS



Electro Chemical Sets

Made in any size for all classes of service.

Send for Bulletin

PRODUCTS:

Electrical Machinery
Steam Engines
Steam Turbines
Condensers
Gas Engines
Oil Engines
Hydraulic Turbines
Pumping Engines
Centrifugal Pumps
Mining Machinery
Metallurgical Machinery
Crushing Machinery
Cement Machinery
Flour Mill Machinery
Saw Mill Machinery
Air Compressors
Air Brakes
Steam and Electric Hoists
Farm Tractors
Power Transmission Machinery

ALLIS-CHALMERS MANUFACTURING COMPANY

Milwaukee, Wisconsin

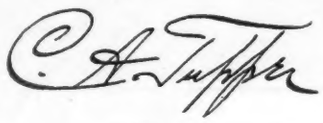
District Offices in All Principal Cities

HE WHO STILL HESITATES

I have no word of criticism for the manufacturer who—facing a period of business uncertainty—marked time for a few months before deciding upon a further definite policy of production, advertising and sales. He may be one who, during the war, placed his every resource at the disposal of the Government; who, to hasten the output of vital war supplies, took verbal contracts which were long unvalidated; who accumulated stocks of raw material which could not subsequently be utilized for his regular commercial lines, or who brought about changes in his plant and personnel that have recently been a source of serious embarrassment. And the same is true of the jobber, the contractor, the dealer who helped the country to "carry on."

Each such man is a hundred per cent American. Neither his motives nor his judgment can be questioned.

But, in justice to his business, to his associates, to his employes, to his country, he cannot stop there. He must go forward the instant the way becomes clear. Hesitation too far prolonged is fatal. Indecision paralyzes industry. A lost grip on trade, on good will, on distribution, is hard to regain. For his own welfare, for the common good, let each manufacturer, each jobber, each contractor, each dealer, lay his plans for the coming fall and winter as soon as possible, and act with the utmost vigor in carrying them through.



PRESIDENT,
INTERNATIONAL TRADE PRESS, INC.,
CHICAGO.

Fibre Conduit keeps cable sheaths safe

Read why the smoothest cableway is both safe and cheap

THE real value of any underground conduit depends on its ability to serve and protect the cable sheaths. And Fibre Conduit has no superior in this regard.

The smoothest cableway

The inside of Johns-Manville Fibre Conduit is a continuous smooth tube, whose joints can be made gas and water-tight. Cable can be pulled through with the minimum of effort and without cutting or abrasion of lead sheaths. This elimination of damage during installation prevents probably nine-tenths of the troubles to which cables are ordinarily subject.

The strongest cableway

The remarkable mechanical strength of Johns-Manville Fibre Conduit enables it to stand shipping, cartage and handling with ease.

Yet for all its strength, Johns-Manville Fibre Conduit is relatively more flexible than ceramic materials; a decided advantage where settlement is apt to occur. Moreover, Johns-Manville Fibre Conduit will not warp, split or scale.

The durable cableway

Johns-Manville Fibre Conduit has been in use about twenty years and, where properly laid and surrounded with concrete, has shown no signs of deterioration. There is, indeed nothing in the composition of Johns-Manville Fibre Conduit that can be affected by earth salts or the acids that may result from seepage from streets and highways. It is dense, non-porous, frost-proof, water-proof and fungus-proof and cannot, therefore, rot or corrode.

The best electrical protection

After immersion in water for 200 hours, Johns-Manville Fibre Conduit with ¼ inch thick walls, indicates an average puncture test of 24,000 volts, and when dry an average of 32,000 volts. A striking proof of insulating efficiency.

And because Johns-Manville Fibre Conduit is not inflammable, there can be no spread of fire in case of arc or flash. The severest temperature, voltage and short circuit tests have demonstrated that Johns-Manville Fibre Conduit will stand up under extremely severe conditions.

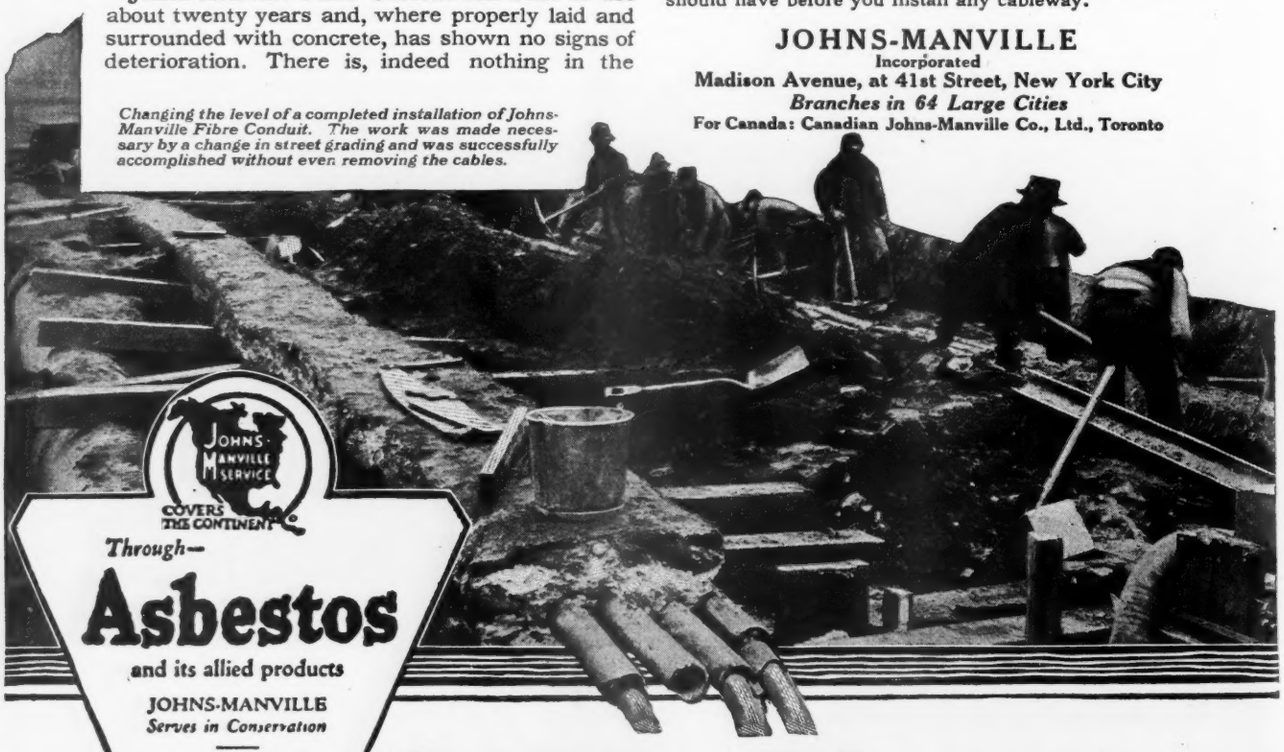
The cheapest cableway

Johns-Manville Fibre Conduit is much cheaper than ceramic materials to buy, and it is cheaper to install because of its lightness, simplicity, strength and adaptability to grade changes, curves, etc. The longer length of each section saves time and expense in laying and reduces the number of joints.

Ask the nearest Johns-Manville branch for the handbook on underground conduits—it contains facts that you should have before you install any cableway.

JOHNS-MANVILLE
Incorporated
Madison Avenue, at 41st Street, New York City
Branches in 64 Large Cities
For Canada: Canadian Johns-Manville Co., Ltd., Toronto

Changing the level of a completed installation of Johns-Manville Fibre Conduit. The work was made necessary by a change in street grading and was successfully accomplished without even removing the cables.



JOHNS-MANVILLE SERVICE COVERS THIS CONTINENT

Through—

Asbestos

and its allied products

JOHNS-MANVILLE
Serves in Conservation

Heat Insulations, High Temperature Cements, Asbestos Roofings, Packings, Brake Linings, Fire Prevention Products

JOHNS-MANVILLE
ELECTRICAL MATERIALS

Contractor-Dealer Issue

SUBSCRIPTION — United States, $3.00; Canada, $5.00; Foreign, $6.00 per year. Single copies, 20 cents.

NOTE—Additional Zone Postage: 1st zone, $1.05; 2nd zone, $1.05; 3rd zone, $1.35; 4th zone, $1.95; 5th zone, $2.25; 6th zone, $2.55; 7th zone, $3.15; 8th zone, $3.45.

CHARLES W. PRICE, *Editor.*

Electrical Review

The Oldest Electrical Weekly in America

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Volume 78. CHICAGO, SATURDAY, JUNE 25, 1921. *Number 26.*

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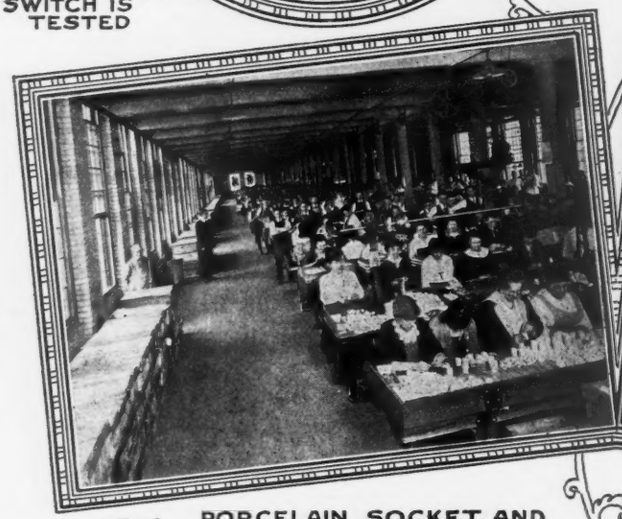
A TRIP THROUGH THE PLANT OF

THE ARROW ELECTRIC COMPANY

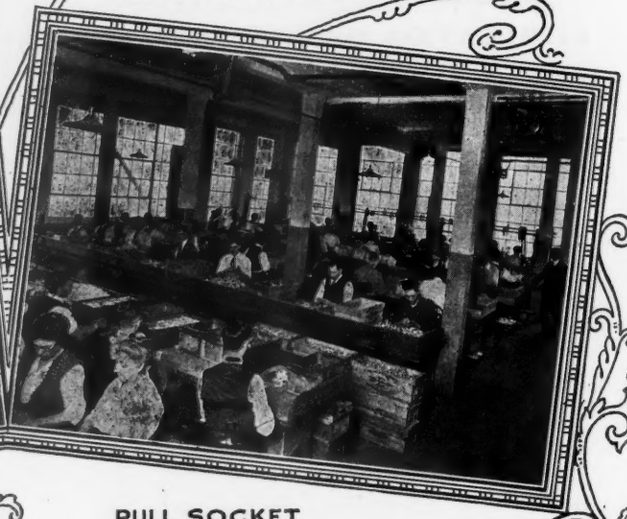
HARTFORD, CONN.

EVERY PUSH BUTTON SWITCH IS TESTED

KEY SOCKET ASSEMBLING



PORCELAIN SOCKET AND PUSH SWITCH ASSEMBLING



PULL SOCKET ASSEMBLING

SURFACE SWITCH ASSEMBLING

TYPICAL SWITCH INSPECTION

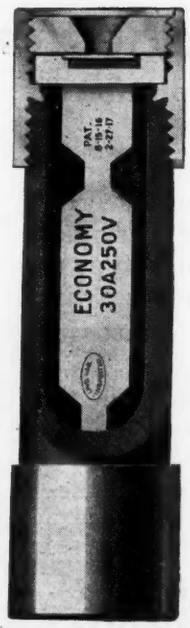
In this final advertisement of our plant we show the Assembling and Testing operations which every "Arrow" device undergoes before being passed for shipment.

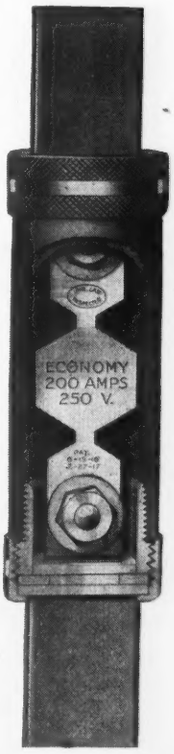
ECONOMY renewable FUSES

combine the two prime requirements of industry—dependable electrical protection and low maintenance costs.

That is why thousands of industrial plants, large and small, using electrical energy install Economy Fuses exclusively in all of their circuits.

The famous Economy "Drop-Out" Renewal Link which makes the restoration of a blown fuse but the work of a moment, also makes possible the saving of 80% annually in fuse maintenance costs as compared to the use of "one-time" fuses.





Economy Fuses were pioneers in the renewable fuse field. They are also the leaders in that field.

This is evidenced by the fact that Economy Fuses were the first line using inexpensive bare renewal links for restoring blown fuses to their original efficiency to be APPROVED IN ALL CAPACITIES by the Underwriters' Laboratories.

Find out what kind of fuses you are using in your plant. Check up on fuse costs.

Install Economy Renewal Fuses—exclusively.

For sale by all leading electrical jobbers and dealers

Economy Fuse & Mfg. Co.
CHICAGO, U.S.A.

Economy Fuses are also made in Canada at Montreal

Kollins Electric Beater

The Cook's Companion

The Home Electrical has arrived and foremost of its labor saving devices is this Electric Beater, useful a score of times in the preparation of every meal. Thousands of the Household type are already in use. A million housewives are ready to purchase.

A larger type, the Commercial, has found immediate acceptance for many applications among Hotels, Cafes, Bakeries, Drug Stores, Hospitals, Clubs, Cafeterias, etc.

Superior construction and Hamilton-Beach motor (detachable for cleansing), will justify your heartiest recommendation.

Order a sample today and start your new prosperity.

Kollins Kitchen Kraft

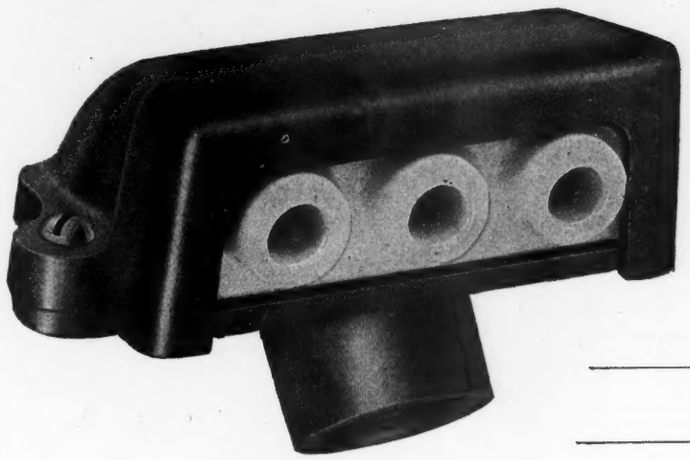
Monadnock Block

CHICAGO

The KILLARK

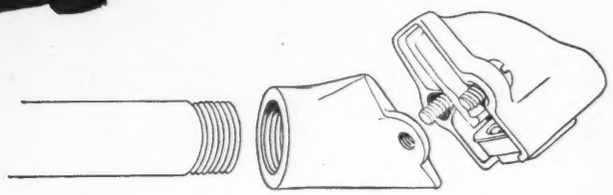
ELECTROLET

TYPE FB

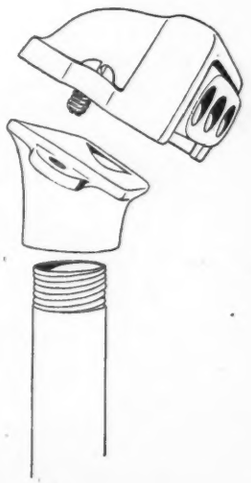


A SERVICE ENTRANCE FITTING

It simplifies entrance fitting work. Absolutely weather-proof. No weak parts or excessive weight. Simple, practical, indestructible, economical. It is covered by basic patent of July 13, 1915.



It Is Reversible



Fits either vertical or horizontal pipes. The covers and porcelains are interchangeable on hubs of three sizes. Will fit pipes from ½ inch to 2 inches. There is a hub for each pipe size.

When installing, if it is a vertical pipe turn the hub outward—if it is a horizontal pipe turn the hub upward—then put on the cover. No screws have to be removed. No parts have to be changed.

The installation man does not have to know before he starts out whether he will have to deal with vertical or horizontal pipes, or the sizes of the pipes on the job. The ELECTROLET will fit.

It is not an ELECTROLET unless it is made by KILLARK
Comes in a checkerboard box.

Order from your jobber, or send 50 cents for a sample ½-inch or ¾-inch Type FB ELECTROLET for either 2, 3 or 4 wire openings—specify which is wanted.

KILLARK

ST. LOUIS ST. LOUIS

KILLARK ELECTRIC MFG. COMPANY

3940-48 Easton Ave., St. Louis U. S. A.

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Sales Come Over the Phone

"HELLO"—The Electric Shop?"

"Well, I want a toaster; yes, send it up, that will be alright—what kind? Why one like that which Mrs. Baxter bought yesterday. Yes, she got it there; Mrs. Green has one too. You know, the kind that makes such nice toast without burning your fingers—REVERSO—that's it; yes, send it up."

* * * * * *

The handsome appearance of the REVERSO makes any housewife proud of her table setting and the display of the REVERSO catches the eye at once.

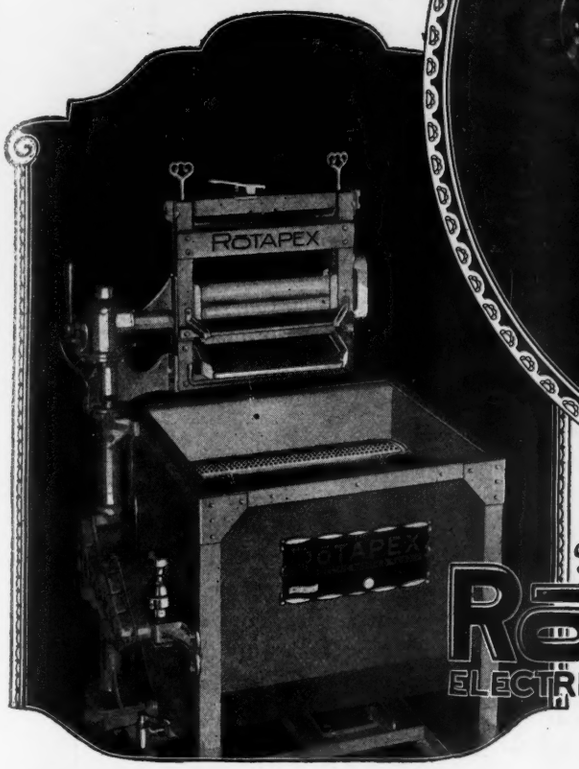
A single sale is a big advertisement because guests immediately notice its superiority and speak of it everywhere.

The REVERSO means bigger business and greater profit.

Send for our sales plan today—reap the reward of the profit in your neighborhood which should be yours.

The Electro-Weld Company
70 Munroe Street - Lynn, Mass.

The Apex ELECTRIC SUCTION CLEANER



The RoTAPEX ELECTRIC CLOTHES WASHER

2 Two Exclusive Apex Features

1. Inclined Nozzle Cleans Under Things as Well as Around Them.

2. Divided Nozzle Cleans Uniformly Across the 13-inch Opening

$616.00 Apex Profits in One Week $666.00 RoTAPEX

In six working days, April 11 to 16 inclusive, 1921, E. A. St. Clair, a salesman working for our dealers in KANSAS CITY, KANSAS, sold 28 APEX Electric Suction Cleaners.

Dealer's Profit *$616.00*
Service Expense . . . . . *.00*

In one week, May 23 to 28 inclusive, 1921, the Cullen Electric Co., Norwalk, Conn., sold twelve (12) RoTAPEX Electric Clothes Washers.

Gross Profit *$666.00*
Service Expense . . . . . *.00*

What these dealers are doing you can do. Hitch your wagon to these twin stars. Follow the lead of the men who have the merchandising plans that MAKE SALES.

Do it NOW. Get ready for the big Fall and Winter business. Write today.

Two of the Many ROTOPEX Features

1. The wringer is reversible. Operates automatically, locks in any one of the five positions. It wrings clothes from the washer to stationary tub, from one tub to another, from tub to basket without moving the washer.

2. The counterbalanced cylinder is made of heavy zinc with galvanized ends. It measures 18 inches in diameter by 18¾ inches long. Its tumbling ribs are of wood—its entire construction rust-proof.

THE APEX ELECTRICAL DISTRIBUTING CO., 1067 East 152nd St., Cleveland, Ohio

Export Office and Show Room:
461 Eighth Avenue, New York City, U. S. A.

Canadian Factory: Apex Electrical Mfg., Company, Ltd.
102-4 Atlantic Ave., Toronto, Ont

Dont Punch Holes in the Umbrella

An Editorial Reprinted from Electrical Merchandising

By Frank B. Rae, Jr.,

IF the umbrella we are carrying begins to leak, we do not punch it full of holes and destroy all the umbrella shops in town. We have more sense than that. And yet, indirectly, we are guilty of acts quite as vindictive and absurd.

For example, concerning the electric light company. It isn't always the best company in the world. It is a monopoly, and people who work for monopolies have an irritating way about them sometimes. You have to deal with them whether you like them or not, and they know it, and so they become abrupt and arbitrary, and you get exasperated and angry.

THEN along comes a vote-seeker. He knows how folk feel toward the electric company. It's his business to get votes, and if he can get yours by cussing the company, he'll cuss as loud and long as you care to listen. If he needs your vote real badly, he will promise to do something to hurt the company—in other words he'll promise to punch holes in the leaky umbrella.

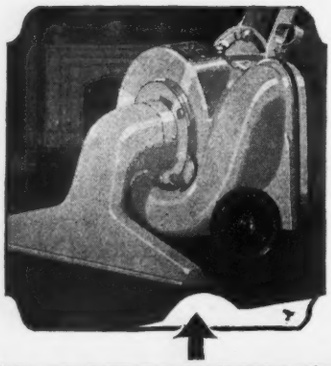
Now, the electric company is providing a necessity of life. It provides light and electric service for our homes and streets, for our offices and shops. It provides heat for cooking and ironing. It provides power without which many of our factories could not run.

As a general proposition the electric company is doing a good job for the community. It is one of our biggest civic industries. The people who run it are about as good as the most of us.

AND the business of making and distributing electricity is a hard business. It is highly technical. You expect to have the light flash on whenever you touch a button, yet if you knew all the intricate and delicate machinery and apparatus required to give you this instantaneous service, you would be aghast with wonderment.

We need the lighting company in our business. You need the lighting company in *your* business. We ask our friends to help us to make it a bigger and better company. For the bigger the company is, the more people it can serve; and the better it is, the better it will serve us all. The first step toward getting more service and better service is to quit punching holes in the umbrella and to stop inciting the politicians to burn down the umbrella shops!

ROYAL
QUALITY SERVICE



CLEANS BY AIR—ALONE

Air-alone cleaning with the Royal is thorough yet gentle. The Royal has none of the faults of the motorized carpet sweepers. It is the true type of electric suction cleaner, developed past the point of relying upon mechanical friction to perform its thorough cleaning service.

THE P. A. GEIER COMPANY, *Manufacturers of* Royal Electric Cleaners, Vibrators and Washing Machines
5113 St. Clair Avenue Cleveland, Ohio

Jim!—

DURALECTRIC Cigar Lighter

"WHAT is that square little box you have on your smoking stand, now?"

"That Mary, is a new cigar lighter—the Duralectric Midget."

"An electric cigar lighter, well, I think that is pretty extravagant."

"Why no, here I'll show it to you. See, isn't it compact and neat? It will burn regular electric light current and it uses no more than the ordinary electric light so you see it is not an expense at all. And besides it does away with my throwing matches all over the place."

"It's a very handsome adornment to your stand, Jim."

"Yes, that combination of mahogany and nickel catches the eye, doesn't it—pretty neat, I think."

"You know, I think I'll give one to Arthur for his birthday."

"Good idea!"

"Where can I get one?"

"Well, downtown. I'll get it for you. Maybe the dealers out here carry them—all of them ought to have them in stock, I know they mean big profit and lots of sales."

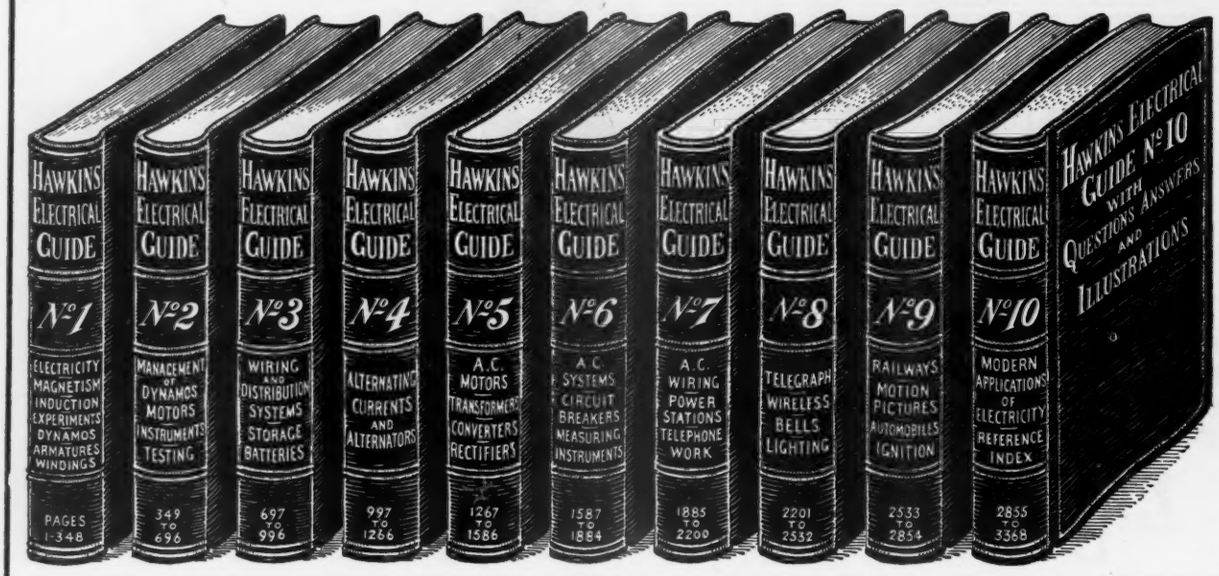
* * * * *

Dealers!

Are you going to have one ready when Jim comes or are you going to let Jim go downtown? Send for literature and our profitable sales plan today.

The Duralectric Corporation
Mt. Tabor Bldg. Jamestown, N. Y.

The Duralectric Sales Co.
Highland Bldg. Pittsburgh, Pa.
SOLE DISTRIBUTORS.



To Win Success You Must Know Facts

The successful man in any business knows something about every phase of his business. The electrical field is far from an exception. Questions and difficulties arise in daily work, new problems must be met, formulae and data are needed but seldom readily available—all requiring information of a definite and authoritative nature.

HAWKINS ELECTRICAL GUIDES give the answer to these problems that perplex and retard progress. Their scope is universal. They're authentic, up-to-the-minute, complete in every detail. They contain no useless information. They answer your questions practically and concisely. Its rules are correct and up-to-date, based on the best practice. They will prove of inestimable value to the wide-awake man who is likely to be called upon for work outside his regular line; for the man who needs at his elbow, for ready reference, an accurate, convenient and authentic work on Electricity.

Ten volumes—3500 pages—4700 illustrations. Black flexible covers and gilt edges—bound in handy pocketbook size.

BRIEFLY—CONTENTS AS FOLLOWS:

Volume One
Electricity Experiments
Magnetism Dynamos
Induction Armatures
Windings

Volume Two
Management of
Dynamos
Motors
Instruments
Testing

Volume Three
Wiring and Distribution Systems
Storage Batteries

Volume Four
Alternating Currents and Alternators

Volume Five
A. C. Motors
Transformers
Converters
Rectifiers

Volume Six
A. C. Systems
Circuit Breakers
Measuring Instruments

Volume Seven
A. C. Wiring
Power Stations
Telephone Work

Volume Eight
Telegraph
Wireless
Bells
Lighting

Volume Nine
Railways
Motion Pictures
Automobiles
Ignition

Volume Ten
Modern Applications of Electricity
Reference Index

$1 per Volume. $10 per Complete Set

INTERNATIONAL TRADE PRESS, Inc.
542-555 Monadnock Block, Chicago

Gentlemen:
My remittance of___dollars is enclosed*.

Mail volumes_____

Name_____

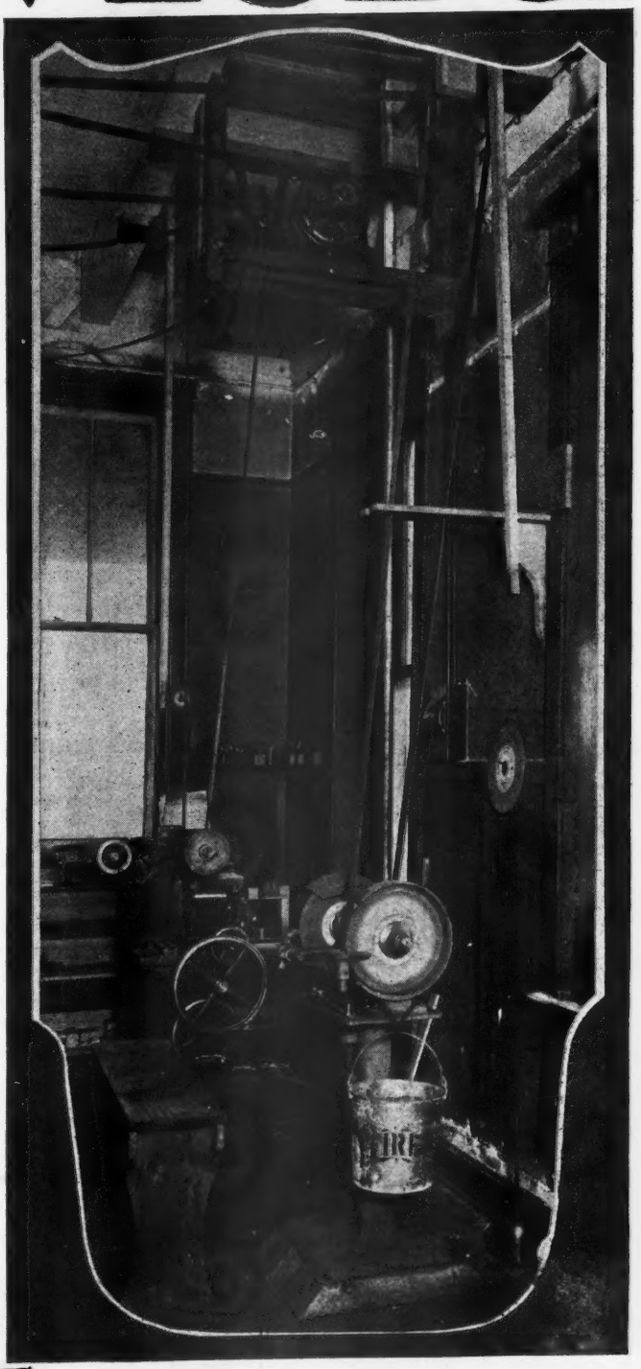
Street address_____

City_____

*Check, Money Order or Currency.

International Trade Press, Inc.
542-555 Monadnock Block
Chicago

Crawford



IF the time ever comes (and it will come) when you need extra qualities in a motor—highly desirable features such as quick start, small efficiency variation, even running and general dependability—then is the time to let your dealer know that you want something extra—a Crawford.

The Heitman Lumber Company of Chicago is using a Crawford on their grinders and reaping the benefits that come with better work, greater economy and more efficient service.

We have built and used our own motors and we know them to be reliable, sturdy and lasting—the quality that will work, tomorrow as well as yesterday.

Crawford Mfg. Company

13-21 Park Row, New York

Factory: Concord. N. H.

We specialize in 2+3 Phase Models—¼—15 H.P.
Speeds 1800, 1200, 900 R. P. M.

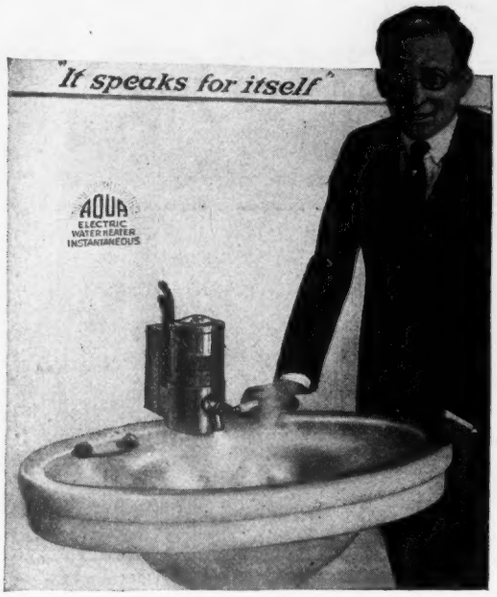
For deliveries from Chicago stock consult Electric Materials Co., 618 W. Jackson Blvd., Chicago. Telephone Haymarket 6484.

Built on a basis of 40° C temperature rise.

Motors

CAN YOU MAKE

2+2=5



Can you boil water by the flame of an ordinary match?

Can you make one horse do the maximum work of six?

Can you lift three tons?

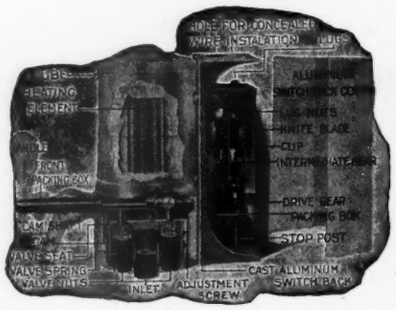
If you can, you should buy lamp socket devices for heating water instantaneously, and you probably will obtain sufficient hot, or even boiling water, for any use at probably no cost.

We agree with all proper authorities, and honest facts that a great many lamp sockets are rated not to exceed 250 watts. But let us figure the extreme maximum lamp sock of 660 watts, with the latter at even 100% efficiency it will raise approximately 50 gals. of water 5 degrees per hour. Think—then watch your step.

If you want hot water when you want it, and want it instantaneously, order by name. Specify voltage and amperage, or model.

MODELS

1 A	110 Volt	60 Amp.	6.6 K.W.
1 B	220 Volt	30 Amp.	6.6 K.W.
2 B	220 Volt	40 Amp.	8.8 K.W.
3 B	220 Volt	50 Amp.	11. K.W.



A LAMP SOCKET CANNOT DO IT

Remind us to tell you about our new model "All Faucet" type, which supplies hot water instantaneously to all hot water outlets in a home—we do it by electricity.

THE AQUA ELECTRIC HEATER CO.

250 West 54th Street **NEW YORK, N. Y.**

TYPE ZB STARTING SWITCHES

The mere pushing of a button will start or stop your small A.C. motor with the help of a type ZB Starting Switch.

This saves time, labor, accidents, power and the need of a skilled operator.

The type ZB Starting Switch gives remote control and protects the motor against overload, lost phase and no-voltage.

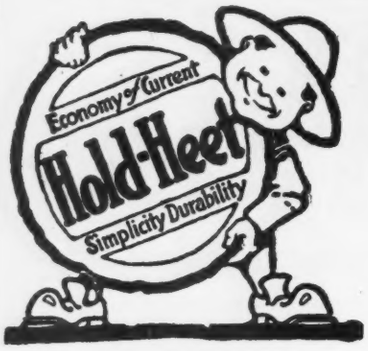
It is absolutely fool-proof and its installation is simple and inexpensive.

Write for Bulletin 1044

THE ELECTRIC CONTROLLER & MFG. CO.

CLEVELAND, OHIO.

BIRMINGHAM - BROWN-MARX BLDG.
CHICAGO - CONWAY BLDG.
CINCINNATI - 1ST NATIONAL BANK BLDG.
DENVER - GAS & ELECTRIC BLDG.
DETROIT - DIME BANK BLDG.
LOS ANGELES - O.E. THOMAS CO.-WASHINGTON BLDG.
NEW YORK - 50 CHURCH STREET
PHILADELPHIA - WITHERSPOON BLDG.
PITTSBURGH - OLIVER BLDG.
SALT LAKE CITY - BOSTON BLDG.
SAN FRANCISCO - CALL BUILDING
SEATTLE - 524 1ST AVE. SOUTH
TORONTO - TRADERS BANK BLDG.

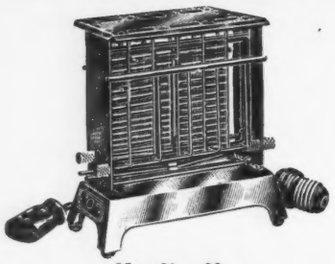


WINNERS

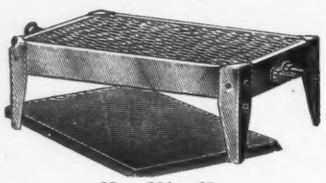
Your success depends upon your ability to pick winners

We went way over the top again in sales last month. Without a question HOLD-HEET is the fastest selling line of appliances on the market today.

GIVE HOLD-HEET A CHANCE TO MAKE GOOD IN YOUR STORE. Considering the small display space necessary, the moderate capital required and their ready saleability, no merchandise in your store will pay the big dividends you can draw from a small investment in HOLD-HEET merchandise.



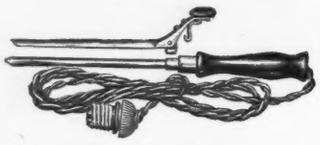
No. 61. $6.



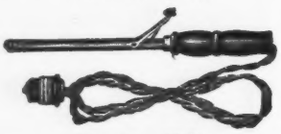
No. 231. $5.

The winning idea back of the Hold-Heet line is quality merchandise at moderate prices

Without low prices, you cannot interest the buyer. Without quality, you cannot make the sale. Hold-Heet is the winning combination.



No. 36. $4.50.



No. 31. $3.50.

No. 21. $3.50.

No. 11. $4.

Write today for descriptive matter on our whole line—dealer discounts show you a substantial profit. 30% on small orders. 33 1-3% on lots of 12 or more, assorted, f. o. b. Chicago. Get started with this winner.

Russell Electric Co., Mfrs.

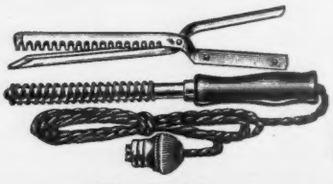
140 West Austin Ave., CHICAGO, ILL.

Ask your Jobber for Hold-Heet

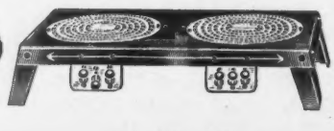
ALLENTON, PA.—Penn Gas & Elec. Sup.
BOSTON—Stuart-Howland Company.
BROOKLYN—Victory Electric Supply Co.
BUFFALO—H. D. Taylor Company.
CHICAGO—Electrical Material Company.
CHICAGO—Washington Light Company.
CLEVELAND—Frankel Light Company.
DALLAS—Electric Specialty Company.
DENVER—Poindexter Supply Co.
DETROIT—Morris Blumberg Elec. Co.
DULUTH—Duluth Electrical Supplies Co.
DULUTH—Marshall Wells Hdwe. Co.
FORT WAYNE—National Mill Supply Co.
GOSHEN, IND.—Goshen Electric Material Co.
KANSAS CITY—Central States Electric Co.
MILWAUKEE—Midwest Electric Company.
MILWAUKEE—Piepkorn Electric Company.
MINNEAPOLIS—Northland Electric Supply Co.
MINNEAPOLIS—Sterling Electric Company.
NEW YORK CITY—Hirshfeld Electrical Supply Co.
NEW YORK CITY—A. Schemel Elec. Company.
OMAHA—Paxton-Gallagher.
PITTSBURGH—Wilson & Daum Company.
ST. LOUIS—Peerless Lighting Company.
ST. LOUIS—General Lighting Supply Co.
ST. PAUL—Price Electric Co.
SAN FRANCISCO—Globe Commercial Company.
TOLEDO—F. Bissell Company.

MANAGER OF EXPORTS—O. P. Brett, 136 Water St., New York.

No. 111. $7.



No. 45. $10.



No. 251. $30.

No. 241. $15.

National Metal Molding

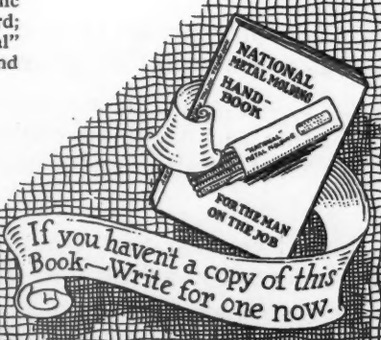
RIGHT now there are real opportunities for Contractor-Dealers everywhere to sell and install National Metal Molding. Our big Advertising Campaign is creating interest in National Metal Molding and how it "Brings Electricity where Needed". This interest can be turned into immediate sales—if you will connect up with this advertising and get behind it with some real sales work. Your Jobber is fully posted on the campaign. Get in touch with him, or write us.

National Metal Molding Co.

Pittsburgh, Pa.

Other "National" Products.

"Sherarduct" and "Economy" Rigid Steel Conduits; "Flexsteel" Armored Conductors and Flexible Metallic Conduit; "Flextube" Non-Metallic Conduit; "Flexcord" Portable Electric Cord; "Liberty" Rubber Covered Wire; "National" Outlet Boxes and Switch Boxes, Locknuts and Bushings, Fixture Studs, Brackets, etc.



"Brings Electricity Where Needed"

Pageant of Progress Exposition

Chicago, July 30 to August 14

"Interesting features in unusual numbers are planned for the Pageant of Progress Exposition which is to take place on the Municipal Pier from July 30 to August 14. The Pageant is backed by the Chicago Boosters Publicity Club and other organizations, including the Chicago Association of Commerce, and it promises to be one of the best things of its kind ever staged in Chicago."

—From Chicago Commerce, February 19, 1921.

To All Manufacturers, Jobbers and Dealers of the U. S.

In compliance with the executive committee's endorsement of the Pageant of Progress Exposition, I want to urge upon all members of the Chicago Association of Commerce and manufacturers, jobbers and dealers generally throughout the country the opportunity and necessity of co-operating with the movement which may bring a million or more people to Chicago during the period of July 30 to August 14. The work of organizing the publicity in connection with the Pageant is assuming such proportions that it is imperative to call upon business houses for some share of the work.

Your co-operation is requested in the following:

(1) A printed statement on your letterheads, billheads, envelopes, statements and other stationery announcing:

Pageant of Progress Exposition
on
Chicago's $5,000,000 Municipal Pier
July 30-August 14, 1921

You may prefer to instruct your stenographic force to add the announcement as a postscript on all outgoing mail.

(2) Organizations sending traveling salesmen out of Chicago might provide some means of spreading publicity about the pageant through their sales forces. Salesmen should use every opportunity to tell the trade about this big event.

May I request that you communicate to Mr. W. L. Ware of the Chicago Association of Commerce the action you contemplate taking in this matter.

Very respectfully yours,

JOSEPH R. NOEL, President
Chicago Association of Commerce

Huge Electrical Dealers' Meeting

At Chicago, August 4-5

To Be Held CO-INCIDENTLY with PAGEANT OF PROGRESS

Under the auspices of the ELECTRICAL REVIEW and representative journals of other industries, during the first week of the Pageant of Progress, August 1-6th, will be held the National Congress of Retail Merchants.

ELECTRICAL REVIEW invites Electrical Dealers and Contractor-Dealers to be present during this Congress and participate in a meeting of great educational value. The Red Room of the Hotel La Salle has been reserved for August 4th, the day devoted to electrical merchandising.

A program of real practical value to all dealers in electrical specialties will be arranged and we urge every dealer who can make the trip to plan to be in Chicago on that day.

As the Pageant of Progress will be the biggest event in Chicago, national in scope, which has occurred since the World's Fair and will offer a program of endless variety of educational value, you should decide now to attend and plan accordingly.

Fill out the coupon and mail it to us at once. Watch the ELECTRICAL REVIEW for further announcements.

ELECTRICAL REVIEW,
Monadnock Block, CHICAGO

I) We) expect to attend the National Pageant of Progress and to participate in the Electrical Dealers' Educational Meeting to be held in the Red Room of the Hotel La Salle on Thursday, August 4th.

Name .....

No. ..... St. City .....

Dated ..... 1921. Advise if you can make hotel accommodations for

State ..... and rate per day from ..... to .....

Real Service—
Real Influence—

The fundamental essential of the value of a magazine's advertising space, lies in its ability to influence the man who has the power to buy.

On this basis we have built up a publication with powerful intensive reader interest appealing to the foremost men in the Engineering Field.

ENGINEERING WORLD, by its high editorial standards, its live discussions by the leaders themselves, of great engineering and construction problems of the day, has made itself an essential factor in the business life of its subscribers. That type of medium pulls.

There is no waste circulation. Its subscription list comprehensively covers the structural, railroading, hydraulic and municipal fields. It reaches the manufacturer supplying equipment and material as well as the civil and general engineer, contractors, public utility and industrial plant officials.

Judicious advertisers are not experimenting with their advertising appropriation when they buy space in ENGINEERING WORLD.

An efficient Service Department is ready and able to furnish compelling copy suggestions, should the advertiser wish them.

For additional information, advertising rates, space reservations, etc., address

ENGINEERING WORLD
542-55 Monadnock Block, CHICAGO

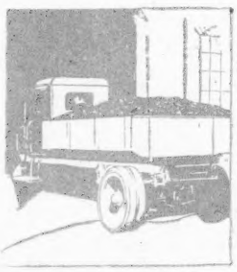
ROME WIRE

A Super-Service Cord built like a Cord Tire

Here at last is the practical flexible cord for portable electrical machinery.

It cannot kink or curl, but always lies flat on the ground.
It may be run through water and oil puddles without harming the insulation.
It may be pulled, jerked, and bent around sharp corners, without breaking the insulation or conductors.
It may be dragged along a crushed stone roadway, or driven over by heavy trucks, without harm to the outer wall.

Why? Because we have built its insulating wall just as they build Cord Tires.



We use a tire tread rubber compound — we put a loose *cord* braid *inside— and we vulcanize under tons of compression.*

This is not an experiment—it is an accomplished *fact.* For years we have planned and built, and tested, and improved. Lengths of Super-Service Cord have been thrown into concrete mixers for 32 hours, laid across roadways for 45 days, bent, hammered, immersed in water, oil, light acids, and alkalies.

Actual work in mills and factories has demonstrated its superiority. One internationally known concern (Ford) tells us that they had a length of Super-Service Cord in use on a floor scrubbing machine for more than two months—whereas the longest life recorded for any other cord was 10 days to 2 weeks!

We make mining machine and mine locomotive gathering cables the same way, so you can see the margin of safety for you in this flexible cord.

Do you make scrubbers, drills, riveters, paint sprayers, welding torches, soldering irons, stage lights or noise machines, fans, portable blowers, auto tire air pumps, etc.? Do you use such machinery? Then get in touch with us today. Equip them with Super-Service Cord. It costs more, but lasts many times longer.

Rome Wire Co., Rome, N. Y. **Diamond Branch, Buffalo, N. Y.**

NEW YORK
CHICAGO

SUPER SERVICE CORD

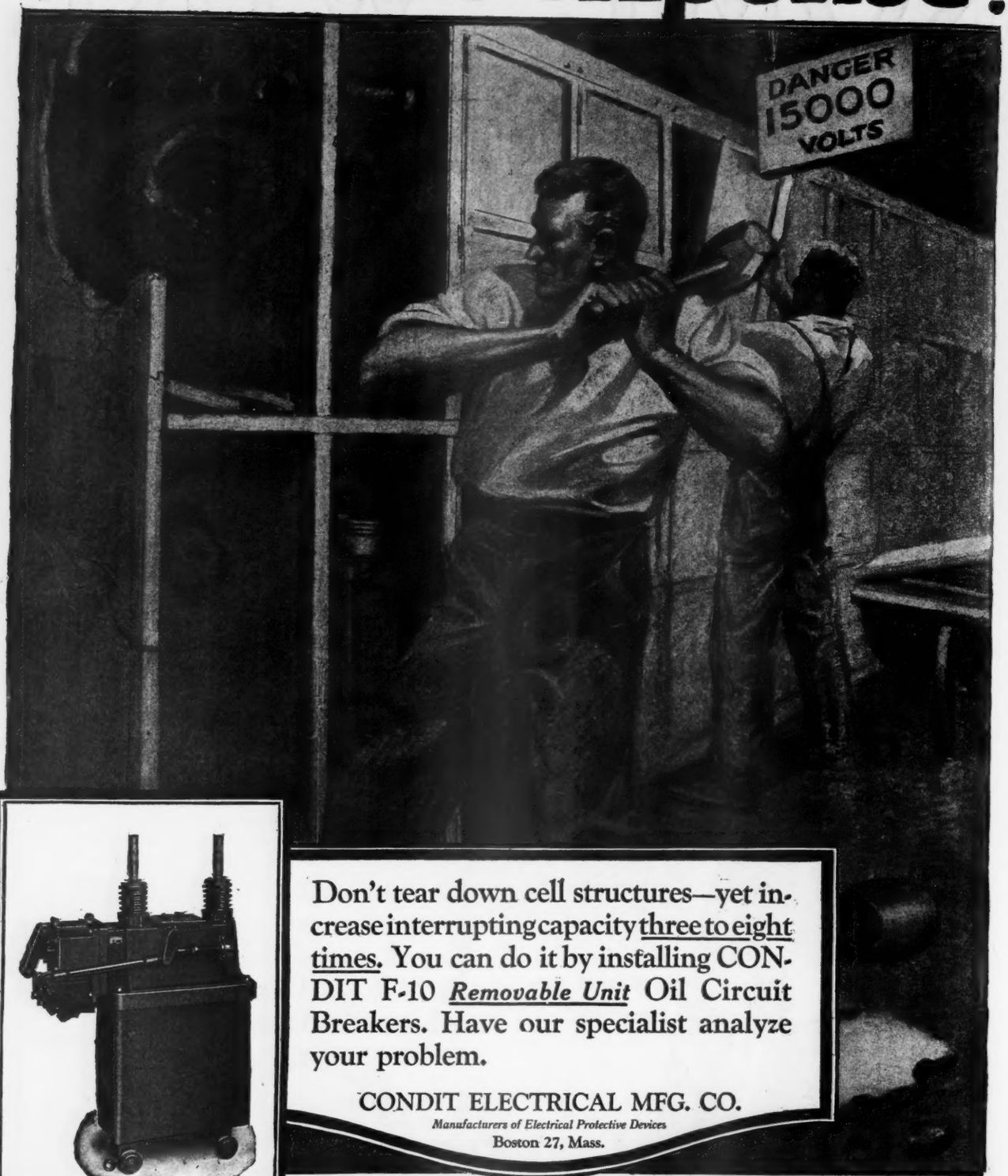
Built like a Cord Tire
RUBBER OUTSIDE
FABRIC INSIDE
Vulcanized under Compression

DETROIT
LOS ANGELES

2018

WIRE = ROME

Save this expense!



F-10 Oil Circuit Breaker

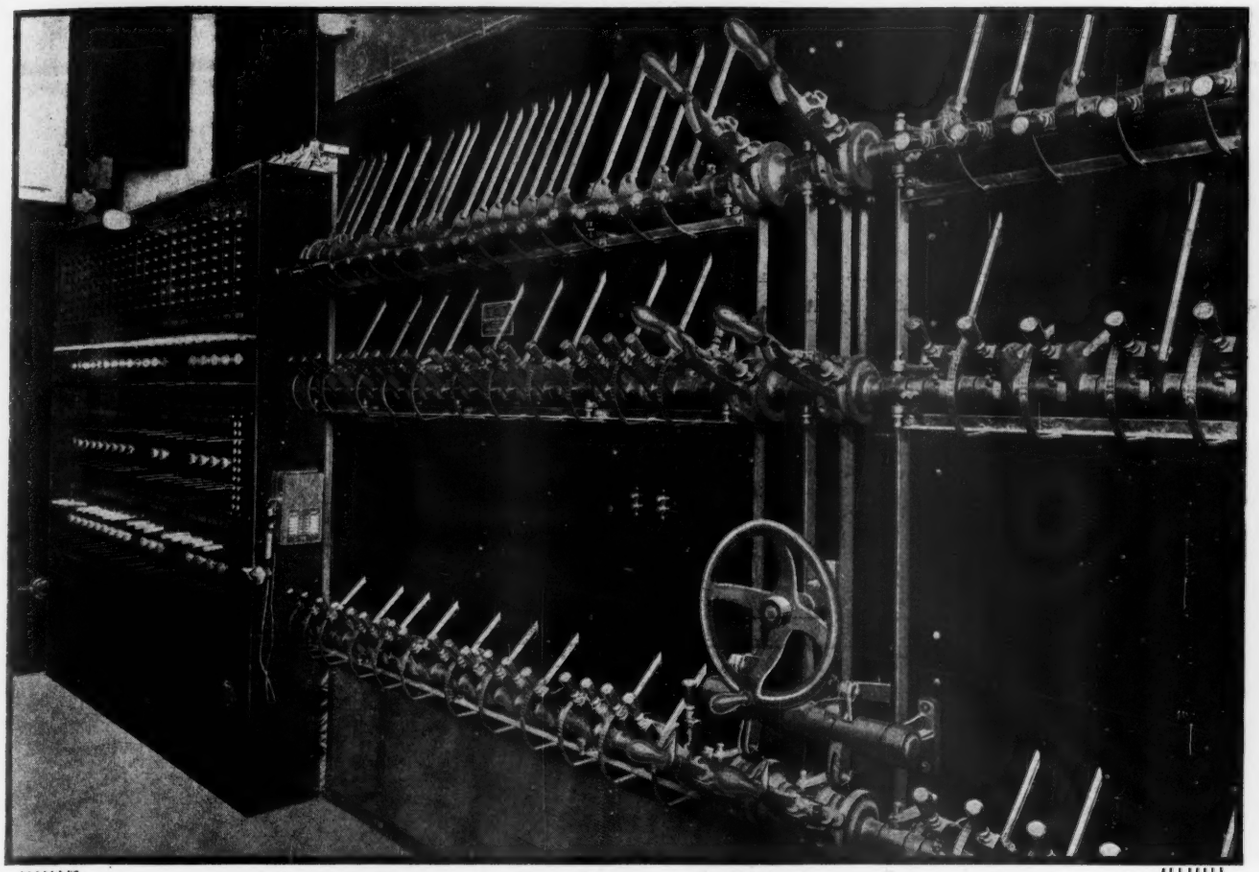
Don't tear down cell structures—yet increase interrupting capacity three to eight times. You can do it by installing CONDIT F-10 *Removable Unit* Oil Circuit Breakers. Have our specialist analyze your problem.

CONDIT ELECTRICAL MFG. CO.
Manufacturers of Electrical Protective Devices
Boston 27, Mass.

Specifications: Manually or electrically operated; 500, 800 and 1,200 amperes—25,000 volts; interrupting capacity 10,000 amperes—15,000 volts; 1, 2, 3 or 4 pole.

122-27

CONDIT



A Portion of the C-H Dimmer and Light Control Board in Chicago's Most Wonderful Theater, the Tivoli.

Producing the Entrancing Color Harmonies With Cutler-Hammer Dimmers

The sensational success of such theaters as the Riviera and Tivoli of Chicago is due in a large measure to the blending of the lighting effects with the various parts of the program. The owners of these theaters know that the subtle power exerted on the audience is what attracts the crowds.

In fact the two theaters mentioned are probably among the first half dozen in the country, and they take full advantage of the effects possible through use of Cutler-Hammer Dimmers.

When you talk to architects or theater owners impress upon them the value of C-H Theater Dimmers. Our publication 445 will help you. **Ask the office nearest you for a copy.**

THE CUTLER-HAMMER MFG. CO.

New York	Chicago	Pittsburgh
Boston	Cleveland	Philadelphia
Cincinnati	Detroit	St. Louis
San Francisco	Los Angeles	Seattle
Denver	Salt Lake City	Birmingham

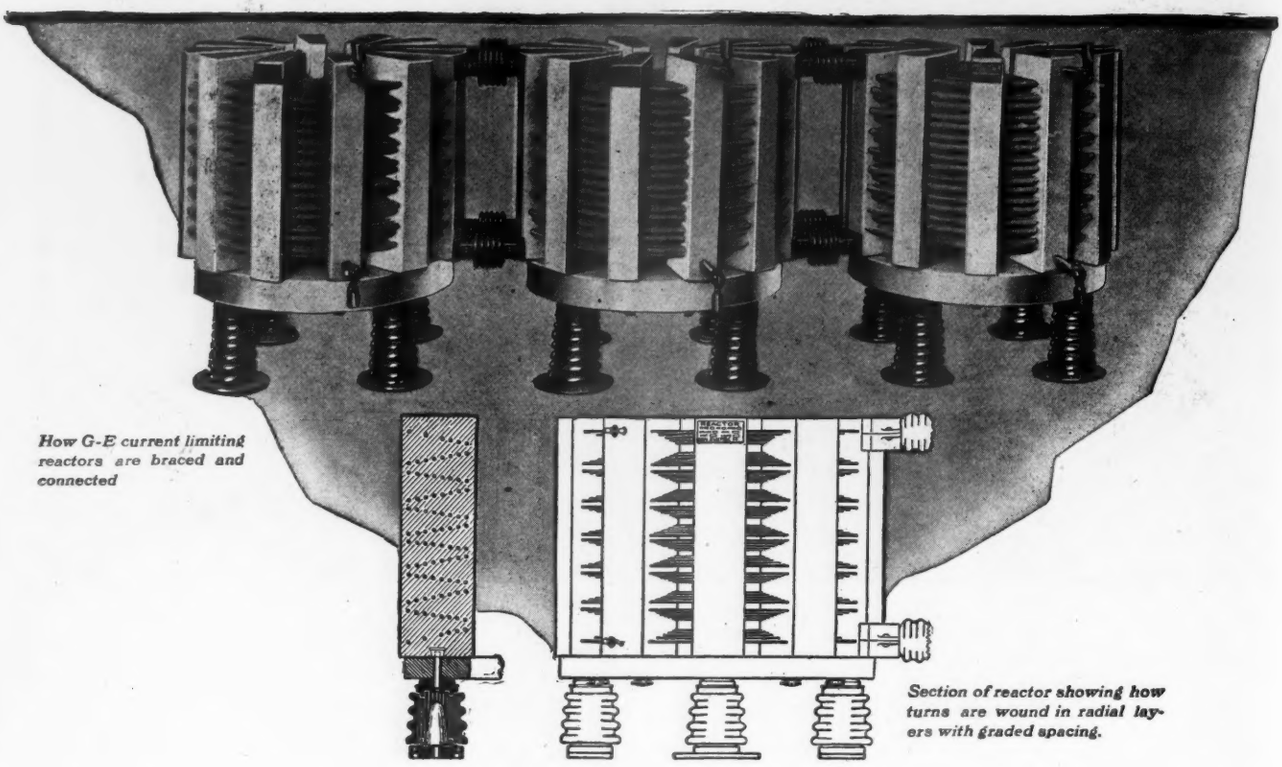
Montreal, Canada England: London & Bedford

Works: Milwaukee and New York

CUTLER-HAMMER

C-H

Where abnormal conditions may occur as a result of short circuits it is desirable to limit these forces to values that equipment can safely handle



How G-E current limiting reactors are braced and connected

Section of reactor showing how turns are wound in radial layers with graded spacing.

Stone-Wall Protection

TO eliminate the disastrous effects of short circuits is the function of G-E Current Limiting Reactors. By their application, systems may be sectionalized and faults localized, making it possible to limit these short circuit forces.

G-E Reactors give permanent protection. No organic materials are used in construction—bare copper cable is cast in specially treated concrete with air spacing insulation extra spaced at end turns when necessary, and graded throughout as potential differences increase. Of open and simple construction—easy to inspect and clean—these Reactors form structures as solid as the station building itself.

G-E Engineers, experts in the application of Reactors, are ready to survey your system and make recommendations. Write our nearest office.

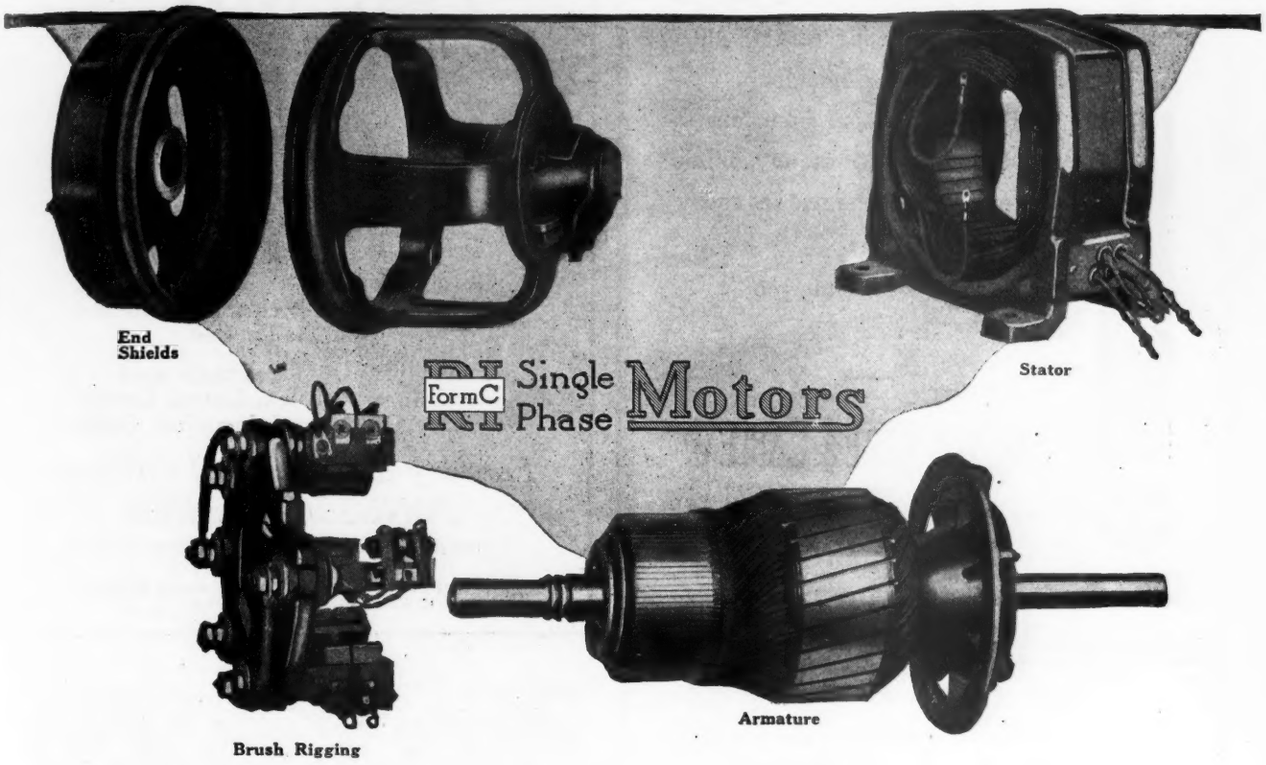
General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

5L16

Other things being equal, machine reliability increases as the number of parts decreases



Only FIVE Principal Parts

With only five principal parts, RI motors appeal to machinery manufacturers demanding simplicity as well as reliability in the driving motor.

The End Shields

The end shield design permits rigid shaft support and protection to coil ends and armature. Ample space allowed to reach brush rigging.

The Stator Winding

Employs cotton-covered enameled wire, carefully insulated, repeatedly impregnated with insulating compound and then baked. The use of link windings obviates the necessity of soldering between stator coils.

The Brush Rigging

Brush yokes are permanently marked for correct brush location for either direction of rotation. The "staggered" brushes are readily removable—provision is made for easy adjustment of brush pressure.

The Armature

No centrifugal switches or similar starting devices. No tendency to spark. Armatures carefully balanced—heavy shafts, hence vibrationless operation.

All Sizes can be Shipped from Stock
Ask nearest G-E Sales Office or Motor Dealer

General Electric Company

General Office Schenectady, N.Y.

Sales Offices in all large cities

45-111

TIREX PORTABLE CORD

Tirex will increase portable tool efficiency by reducing cord troubles and renewals to a minimum.
It stays on the job from four to five times as long as any fabric covered cord on the market today

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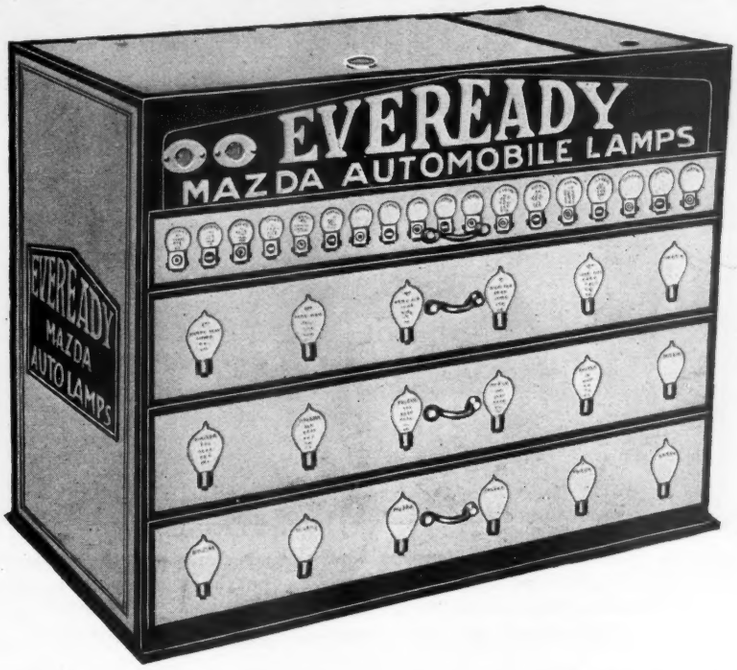

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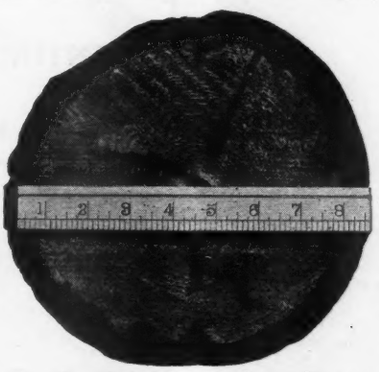

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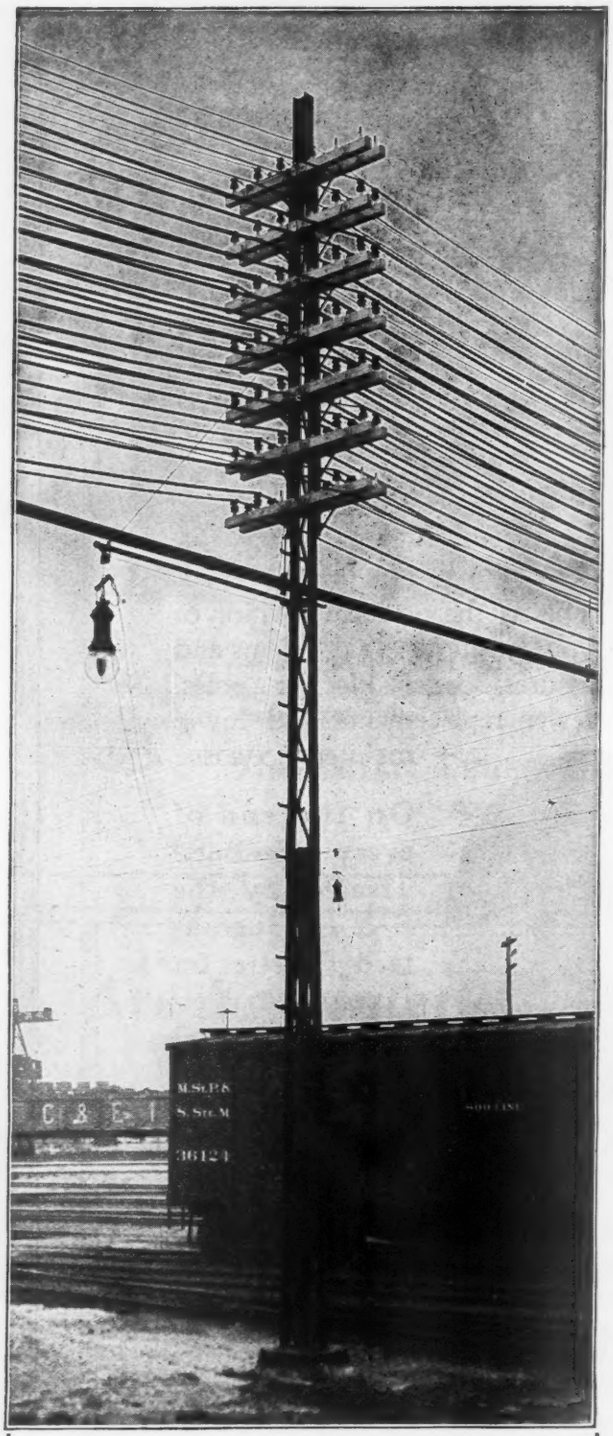

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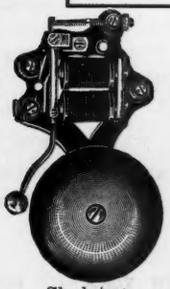
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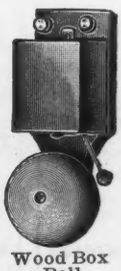
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TREASURY DEPARTMENT, Supervising Architect's Office, Washington, D. C., June 17, 1921.—SEALED PROPOSALS will be opened in this office at 3 p. m., July 11, 1921, for the installation complete of an electric passenger elevator in the Infirmary, U. S. Public Health Service Sanatorium, at Dawson Springs, Ky., in accordance with the drawing and specification, copies of which may be had at this office in the discretion of the Supervising Architect. Jas. A. Wetmore, Acting Supervising Architect.

TREASURY DEPARTMENT, Supervising Architect's Office, Washington, D. C., June 16, 1921.—SEALED PROPOSALS will be opened in this office at 3 p. m., July 8, 1921, for the installation complete of an electric dumb waiter in the United States Post Office at Lima, Ohio, in accordance with the drawings and specification, copies of which may be had at this office in the discretion of the Supervising Architect. Jas. A. Wetmore, Acting Supervising Architect.

TREASURY DEPARTMENT, Supervising Architect's Office, Washington, D. C., June 9, 1921.—Sealed proposals will be opened in this office at 3 p. m., June 30, 1921, for supplying to the various public buildings under the control of the Treasury Department hand, electric, portable vacuum cleaners during the fiscal year ending June 30, 1922, in accordance with the specifications, copies of which may be had at this office in the discretion of the Supervising Architect. Jas. A. Wetmore, Acting Supervising Architect.

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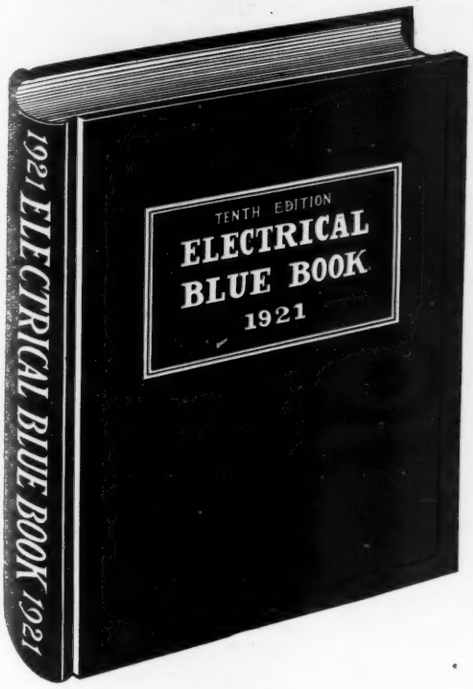

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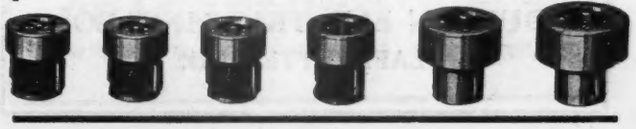

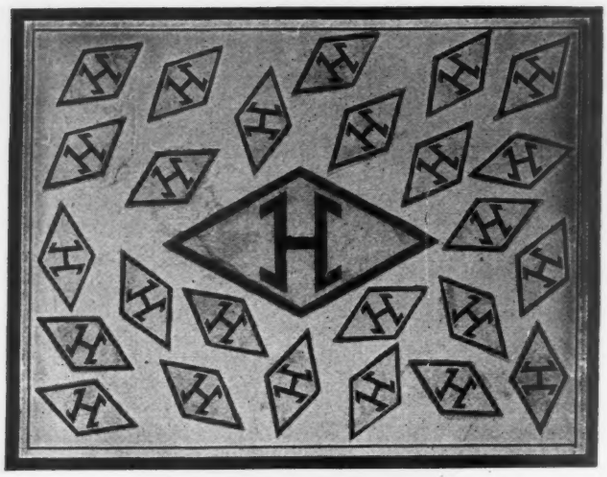

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Johns-Manville, Inc.
Schoonmaker Company, A. O.
Westinghouse Elec. & Mfg. Co.

FURNACES, ELECTRIC.
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General Electric Co.
Pittsburgh Electric Furnace Corp.

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FUSE CASES, PLUG, Non-Renewable (Indicating and Non-Indicating).
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Western Electric Co.

FUSE PLUGS.
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Arrow Electric Co.
Bussmann Mfg. Co.
Chicago Fuse Mfg. Co.
Daum, A. F.
Economy Fuse & Mfg. Co.
General Electric Co.
Killark Electric Mfg. Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

FUSES.
Bussmann Mfg. Co.
Chicago Fuse Mfg. Co.
Condit Electrical Mfg. Co.
Daum, A. F.
D. & W. Fuse Works of G. E. Co.
Economy Fuse & Mfg. Co.
Electrical Engrs. Equipment Co.
Federal Sign System (Electric).
General Electric Co.
Johns-Manville Co., H. W.
Killark Electric Mfg. Co.
Monarch Refillable Fuse Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

FUSES, Cartridge. Non-Renewable and Renewable.
D. & W. Fuse Works of G. E. Co.

FUSES (Enclosed).
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Chicago Fuse Mfg. Co.
Condit Electrical Mfg. Co.
General Electric Co.
Monarch Refillable Fuse Co.
Westinghouse Elec. & Mfg. Co.

FUSES, High Tension.
General Electric Co.
Railway & Industrial Engrg. Co.
Westinghouse Elec. & Mfg. Co.

FUSE CLIPS, Terminals.
Chicago Fuse Mfg. Co.
D. & W. Fuse Works of G. E. Co.
General Electric Co.
Sherman Mfg. Co., H. B.
Westinghouse Elec. & Mfg. Co.

FUSES AND FUSE SPECIALTIES.
D. & W. Fuse Works of G. E. Co.

GASKETS.
Johns-Manville, Inc.

GATES, Head.
American Bridge Co.

GEARS, Cut.
Fawcus Machine Co.

GEARS, Rawhide and Composition.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

GEARS, Silent Chain.
Morse Chain Co.

GENERATORS.
Allis-Chalmers Mfg. Co.
Crocker-Wheeler Co.
Eck Dynamo & Motor Co.
General Electric Co.
General Electric Co., Ft. Wayne Dept.
Ideal Electric & Htg. Co.
Marble-Card Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

GLASSWARE, Illuminating.
Western Electric Co.

GLOBES, Arc Light (Outer and Inner).
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

GLUE POTS, Electric.
General Electric Co.

GRINDERS.
Western Electric Co.

GRIPS (Havens and Buffalo).
Smith & Hemenway Co., Inc.

GUARDS, Inc. Lamp.
Benjamin Electric Mfg. Co.
Hubbell, Inc., Harvey.
McGill Mfg. Co.
General Electric Co.

HANGERS, Conduit and Molding.
Western Electric Co.

HANGERS AND CLAMPS.
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Standard Underground Cable Co.
Steel City Electric Co.
Thomas & Betts Co.

HANGARS, Air Ship.
American Bridge Co.

HARDWARE, Pole Line.
Ohio Brass Co.
Smith & Hemenway Co.
Thomas & Sons Co., R.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

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General Electric Co.

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Aetna Electric Appliance Co.
Aqua Electric Heater Co.
Cutler-Hammer Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

HEATERS, Industrial.
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General Electric Co.
Westinghouse Elec. & Mfg. Co.

HEATING.
Cutler-Hammer Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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D. & W. Fuse Works of G. E. Co.

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Nordberg Mfg. Co.

HOISTING MACHINERY, Electric Mine.
Allis-Chalmers Mfg. Co.
General Electric Co.

HYDRAULIC MACHINERY.
Allis-Chalmers Mfg. Co.

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General Electric Co., Ft. Wayne Dept.
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Roller-Smith Co.
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Westinghouse Elec. & Mfg. Co.

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McGill Mfg. Co.
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Formica Insulation Co.
Sherwin-Williams Co., The.
Standard Underground Cable Co.
Westinghouse Elec. & Mfg. Co.

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General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Continental Fibre Co.
Formica Insulation Co.
General Electric Co.

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Garfield Mfg. Co.
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General Electric Co.
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International Insulating Corp.
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Northern Industrial Chemical Co.
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Cutter Works, George.
General Electric Co.
Shaw Insulator Co.
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General Electric Co.
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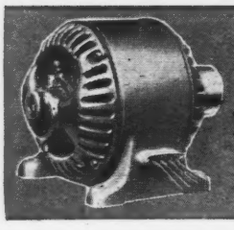

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Economical Electric Lamp Division.
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Flux Miniature Lamp Division.
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Monarch Incandescent Lamp Division.
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Shelby Lamp Division.
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MAGNETS, Electro.
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Electric Controller & Mfg. Co.
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MOTORS, Fractional H.P.
Racine Electric Co.
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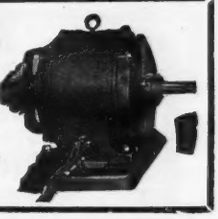

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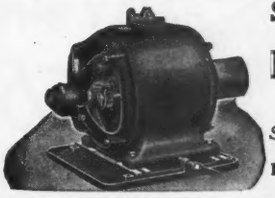

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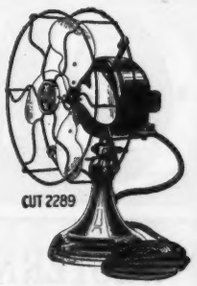

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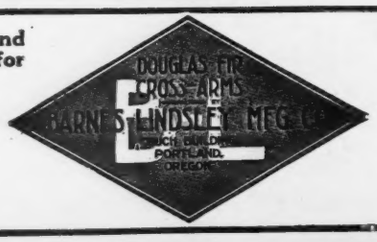

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Torrey Cedar Co.
Valentine-Clark Co.
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Anderson Mfg. Co., A. & J. M.
Cutter Works, Geo.
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Illinois Electric Porcelain Co.
Ohio Brass Co.
Thomas & Sons Co., R.
Westinghouse Elec. & Mfg. Co.

PORCELAIN, Standard.
General Electric Co.
General Porcelain Co.
Illinois Electric Porcelain Co.
Ohio Brass Co.
Thomas & Sons Co., R.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

POSTS, Lamp.
Cutter Works, Geo.

POTENTIOMETERS.
General Electric Co.
Leeds & Northrup Co.

POTHEADS AND SLEEVES.
Brady Electric Mfg. Co.
Electric Engrs. Equipment Co.
General Electric Co.
Johns-Manville, Inc.
Standard Underground Cable Co.

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Electrical Engrs. Equipment Co.

PRODUCERS, Gas.
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

PRESERVATIVES.
Barrett Company, The.

PROJECTORS Electric (Search Lights).
General Electric Co.
General Electric Co., Ft. Wayne Dept.
Western Electric Co.

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Cutter Works, George.
General Electric Co., Ft. Wayne Dept.

PUMPS, Centrifugal.
Allis-Chalmers Mfg. Co.

PUMPS, High Speed.
Cramp & Sons Ship & Engine Bldg. Co., Wm., I. P. Morris Dept.

PUMPS, Vacuum.
General Electric Co.

PUMPS. Water.
Allis-Chalmers Mfg. Co.

PUSH BUTTONS.
Benjamin Electric Mfg. Co.
Cutler-Hammer Mfg. Co.
General Electric Co.
Western Electric Co.

PYROMETERS, Electric.
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RAILWAY EQUIPMENT, Electric.
American Bridge Co.

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General Electric Co.
Johns-Manville, Inc.
Ohio Brass Co.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

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Arrow Electric Co.
Benjamin Electric Mfg. Co.
General Electric Co.

RECEPTACLES, Weatherproof.
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Benjamin Electric Mfg. Co.
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General Electric Co.
Hubbell, Inc., Harvey.

RECTIFIERS.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

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Cooper-Hewitt Electric Co.
General Electric Co.

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(See Shades.)

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Roller-Smith Company.
Westinghouse Elec. & Mfg. Co.

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General Electric Co., Ft. Wayne Dept.
Western Electric Co.
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General Electric Co.

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Copper Clad Steel Co.
Roebling's Sons Co., John A.

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American Bridge Co.
Blaw-Knox Company.

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Smith & Hemenway Co., Inc.

SCALES.
Reliance Weighing Machine Co.

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Cutler-Hammer Mfg. Co.

SHADE HOLDERS.
Arrow Electric Co.
Benjamin Electric Mfg. Co.
General Electric Co.
Hubbell, Inc., Harvey.
Western Electric Co.

SHADES, Glass.
Beardslee Chandelier Co.

SHADES, Metallic.
Benjamin Electric Mfg. Co.
Cutter Works, George.
Erdle Perforating Co.
Hubbell, Inc., Harvey.
Ostrander & Co., W. R.

SHEETS, Brass and Copper.
American Brass Co.

SHELVING, Steel.
Lupton Sons Company, David

SHERARDIZING OVENS, Electric.
General Electric Co.

SHEDS, COLD STORAGE.
American Bridge Co.

SHEDS, TRAIN.
American Bridge Co.

SHEETS, Iron and Steel.
American Sheet & Tin Plate Co.

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Federal Sign System (Electric).

SILENT CHAIN DRIVES.
Federal Sign System (Electric).
Morse Chain Co.

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Westinghouse Elec. & Mfg. Co.

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Standard Underground Cable Co.

SLEEVINGS.
Belden Mfg. Co.
Chicago Mica Co.
General Electric Co.
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Federal Sign System (Electric).
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Johns-Manville Inc.
Ostrander & Co., W. R.
Western Electric Co.
Westinghouse Elec. & Mfg. Co.

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Manross & Sons, F. N.

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Morse Chain Co.

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American Bridge Co.
Blaw-Knox Company.

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Anderson Mfg. Co., A. & J. M.
Cutler-Hammer Mfg. Co.

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Chicago Fuse Mfg. Co.

STAMPS, Steam.
Nordberg Mfg. Co.

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Leeds & Northrup Co.
Weston Electrical Instrument Co.

STATIONS, Coaling.
American Bridge Co.

STATIONS. Elevated Ramway.
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STEAM TRAPS.
Johns-Manville, Inc.

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Klein & Sons, Mathias.
Neversllp Works, The
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Smith & Hemenway Co., Inc.
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TOOL STANDS, Steel.
Lupton Sons Company, David

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McGill Mfg. Co.

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TROLLEY MATERIALS, Electric.
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TRUSSES, Roof.
American Bridge Co.
Blaw-Knox Company.

TUBES, Brass and Copper.
American Brass Co.

TUBING.
National Metal Molding Co.

TUBING, Condenser.
American Brass Co.

TUBING, Varnished.
Irvington Varnish & Ins. Co.

TAPE, Cambric, Varnished.
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De Laval Steam Turbine Co.
General Electric Co.
Kerr Turbine Co.
I. P. Morris Dept. of Wm. Cramp & Sons.

TURNBUCKLES.
General Electric Co.

VACUUM CLEANERS—
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VARNISHED CAMBRIC.
Irvington Varnish & Ins. Co.

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Cramp & Sons Ship & Engine Bldg. Co., Wm. I. P. Morris Dept.

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Western Electric Co.
Westinghouse Elec. & Mfg. Co.

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Ohio Brass Company.

WELDING, Electric, Oxy-acetylene, Forge and Hammer.
Blaw-Knox Co.

WINDERS, Electro-Magnet.
Belden Mfg. Co.

WINDINGS.
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WINDLASSES, Arc Lamps.
Brady Electric Mfg. Co.
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WINDOW SASH, Steel.
Lupton's Sons Company, David

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Phillips Wire Co.
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American Brass Co.
Belden Mfg. Company
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Rome Wire Co.

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Roebling's Sons Co., John A.

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NEW ADDITION TO THE DUALITE FAMILY

DUALITE

In 75, 100 and 200 watts

NITROGEN WHITELITE LAMPS

From 40 to 1000 watts

From the day the DUALITE lamp was first placed on the market, in October last, the DUALITE idea took strong root in the minds of lamp users. Since then the DUALITE idea has been expanding and circulating wider and wider.

From everywhere requests have been pouring in upon us for a DUALITE of smaller unit, 'til in the end we have yielded to the pressure and brought out the 75 watt DUALITE. So then for the present the DUALITE is to be had in the following three sizes:

Watts	Volts	Price
75	110-125	$1.20
100	110-125	$1.50
200	110-125	$3.00

The DUALITE is fully protected by U. S. Patents, and is made and controlled exclusively by

WHITELITE ELECTRIC CO., 368-70 Broome Street, New York City

AMERICAN CIRCULAR LOOM CO. TRADE MARK

For Users who Want the Best

"XDUCT"

—Galvanized Conduit.

Easy bending spellerized steel tube, protected from rust by pure non-corrosive zinc. Inside enameled.

"ELECTRODUCT"

—Enameled Conduit.

Spellerized mild steel tube—enameled inside and out. Unaffected by weather. Clean threads.

"CIRCULAR LOOM"

—Flexible Conduit.

Fibre Spiral Soapstoned Interior, covered with insulation tape—protected by heavy woven cotton jacket.

"LOOMFLEX"

—Flexible Conduit.

Indestructible—easy to fish. Roller bearing construction of interior allows wires to slide through with minimum friction.

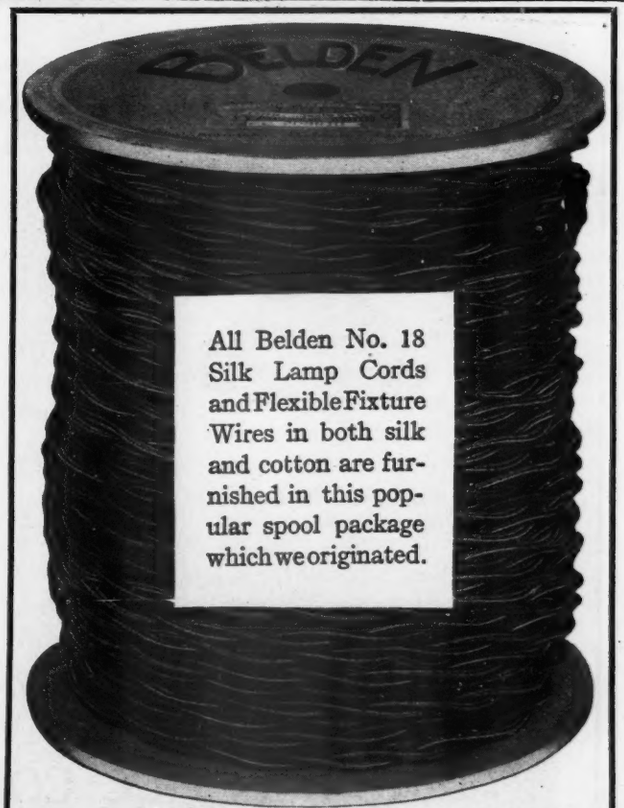
Send for Samples

American Circular Loom Co.

90 West St., New York

Boston Chicago Los Angeles San Francisco Seattle Toronto

3



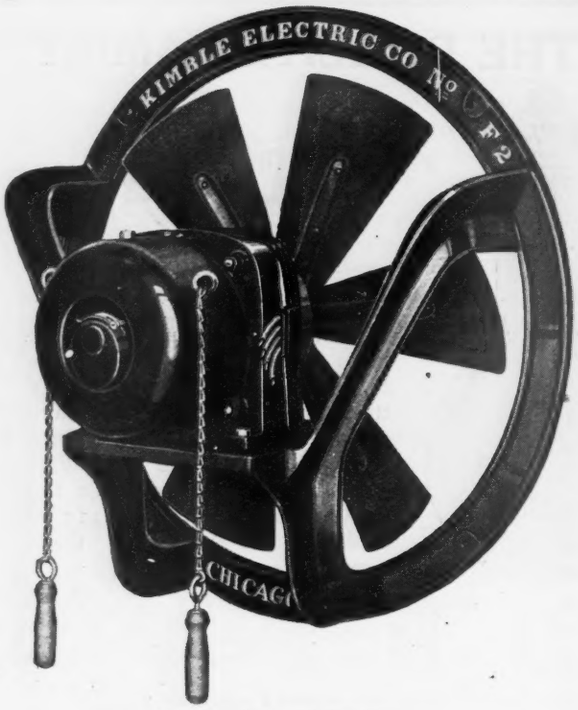
All Belden No. 18 Silk Lamp Cords and Flexible Fixture Wires in both silk and cotton are furnished in this popular spool package which we originated.

BELDEN MANUFACTURING COMPANY

Electrical Wire, Cable and Cordage

Main Office and Factory: Chicago, Ill.

Eastern Warehouse: Metuchen, N. J.



18", 24", 30" and 36" sizes.
Alternating current only.
Single, two or three phase service.

KIMBLE

FLR Ventilating Fan CHAIN-CONTROL

with 90% speed reduction

This single phase variable speed fan motor gives every imaginable speed from maximum, down to 10%—in either direction.

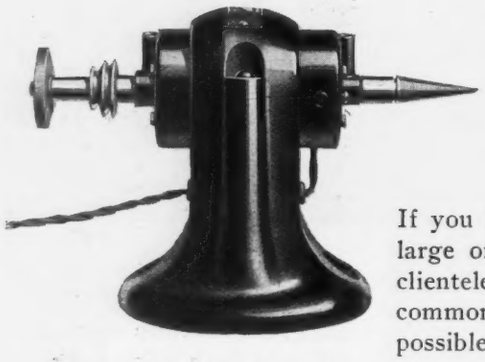
Pulling a chain shifts the brushes
And current is metered proportionate to speed

Tests show that output per watt-hour increases as speed decreases, until at 50% maximum speed the output per watt-hour is practically double that of maximum speed. This means twice as much air is moved per dollar of cost at half speed as would be obtained from a resistance-control fan.

Fan has no auxiliary windings, starting devices or transformer. Its simplicity is reflected in a reasonable price.

Send for our FLR Fan Bulletin

KIMBLE ELECTRIC COMPANY
630 N. Western Ave., CHICAGO



Racine Motors

If you handle Racine Motors the field of your customers is a large one. From dentist to shop will be the extent of your clientele. Men who know motors and who will stand for no commonplace machine, men to whom dependability means the possible making or breaking of a piece, the gain or loss of profit.

These are the men who need the Racine Motor and Racine reliability.

We build motors, buffers and grinders for home, shop, laboratory or store adapted to D. C. or A. C. current—25 to 60 cycles—110 to 130 volts—other voltages built to order.

A card takes but an instant to write, and we have a plan that is to your interest to know.

RACINE ELECTRIC CO.
RACINE, - - WIS.

Campbell ELECTRIC CO.

CAMPBELL TIME SWITCHES

Wherever There Is a Night-Light

The owner of every electric sign, window display or ornamental lighting post, every municipality having electric street lighting systems, every concern involving the use of storage batteries, in fact everyone that has a light to turn on early or a light to turn off late is a customer for the man who handles Campbell Time Switches.

Campbell Time Switches combine sturdy construction with certainty of operation. With their use there is not the slightest danger of your forgetting—your lights will go on or off as set, without fail.

We protect every dealer with our ample guarantee against defect and faulty workmanship and insure a good profit with every sale. We back you—investigate our proposition and handle Campbell Switches.

Made in one-day and eight-day sizes. Write at once.

CAMPBELL ELECTRIC COMPANY
LYNN, MASS.

Western Electric Items

Number 16 — June 25, 1921

LUMINOUS FLIP SWITCHES

Instantly answer the question "Where IS That Switch?"

Western Electric Flip Switches meet the demand for artistic design in the small devices about the home. They meet the demands for reliability for they are positive in action and safe at all times.

Their smooth surfaces are unbroken by screw heads. Their symmetrical flip levers produce a sightliness that harmonizes with the artistic effects most people seek. They blend with the decorative scheme of a room and are unobtrusive.

In a darkened room the Luminous Flip-Switch instantly answers the question "Where IS that switch?"

As the accompanying illustration of the luminous type shows they are easy to find and to operate. They instantly answer the question, "Where IS that switch?" An upward flip of the finger brings the light.

Mechanically, these switches are simple, rugged and positive in action. The switch cannot take an intermediate position. Its contacts are either positively open or positively closed.

The plate always rests flat against the wall and preserves its alignment even if the box is at an angle. It is self-locking and it positively cannot work loose.

These switches are made in a variety of types to meet every need. There are single, gang and tandem plates. There is a Lock Type Switch which prevents tampering with lighting circuits. There are Single-pole, Double-pole, Three-way and Four-way types.

These Flip Switches are used in the best known hotels and in clubs and homes famous for the artistic character of their equipment. This is proof positive of their compliance with the most exacting requirements of design and mechanical operation.

These Flip Switches and folders describing and illustrating them are available at our nearest Distributing House.

EVERY KIND OF FLEXIBLE CORD FOR EVERY PURPOSE

You can specify and furnish the most suitable flexible cord for every purpose. Western Electric National Service brings it practically to your door.

This cord is made in special forms and with coverings best suited for each kind of installation and use.

Every size is obtainable. The wide variety of cords available enables you to sell the most suitable kind for lighting fixtures, household appliances, motor cars and trucks and for outdoor and industrial uses where the cord must resist the effects of moisture, fumes and weather.

These Western Electric Flexible Cords meet the requirements of the National Board of Fire Underwriters (National Code Standard).

Our nearest Distributing House can supply you with every kind of flexible cord for every application.

DIELECTRIC STRENGTH AT TAPED JOINTS DEPENDS ENTIRELY ON THE TAPE

Dielectric strength is as essential at taped joints as along the insulated wires themselves. It emphasizes the necessity for quality in tape. It depends on the ability of the tape to retain its insulating value, its resistance to climatic effects and its adhesive qualities.

The basis of Amazon Friction Tape is a tough, durable, closely woven fabric. The fabric is thoroughly impregnated with two coats of insulating compound. Two coats of adhesive compound are added. The finished tape is even, free from pin holes and has a tensile strength of 35 pounds. It resists moisture. It has high insulating value and lasting adhesive qualities. There are no chemicals to corrode copper or cause trouble.

Thorough tests have proven the durability of Amazon Tape and of its dielectric strength.

Amazon is a higher quality of tape, more economical, footage considered, running approximately 80 feet per roll.

Victor Tape, running, approximately 75 feet per roll, is an excellent tape at moderate price and meets all requirements on ordinary electrical circuits.

Both grades are shipped in rolls of 8 oz. net weight.

Write our nearest house for samples.

A GROUND FLOOR OPPORTUNITY TO OBTAIN THE PROFITS IN HOUSEHOLD APPLIANCES

You can put washday to work for you. In nearly every laundry there is a big opportunity for a sale right now of a Western Electric Ironer with Ruffler.

The aversion nearly every woman bears toward the laundry drudgery will work with you.

Plans are ready to help you make these sales. They have been found successful. They will help you get the business that exists right in your town.

The Ironer with Ruffler does the work it's designed to do. It does it as it should be done. Servicing is at a minimum.

Seated at the machine, the operator feeds in the general laundry work, the household linen and the underclothes. She controls the machine with either the foot or the hand bar. To iron ruffles, the Ruffler, a feature exclusive on the Western Electric Ironer comes into play.

This Ironer with Ruffler is part of the complete one-name-line of Western Electric Housekeeping Appliances. Sales of other Western Electric appliances will help you sell it. It in turn will help you sell additional appliances. Faith in the name Western Electric and satisfactory performance will work with you and and for you.

Phone or write to our nearest Distributing House. Our representative can show you how to increase your business with these plans and the complete line of Western Electric Housekeeping appliances.